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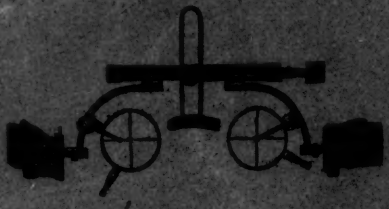

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THE BRITISH JOURNAL
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OCTOBER, 1942

COMMUNICATIONS

A STATISTICAL ANALYSIS OF 3,219 PERSONS*
Certified Blind at the Regional Clinic for Certification of the Blind, Glasgow and South-West Scotland, During the Period 1929-1935

BY

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(Conclusion)

VI.—SUMMARY AND CONCLUSIONS.

1. This paper sets out the results of the analysis of information regarding 3,219 cases found blind at the Regional Clinic for the Certification of Blind Persons in Glasgow and South-West Scotland.

2. The method of examination by a Medical Board and the standards of blindness are described. It is shown that the visual

* "This report was intended for publication in the Special Reports Series of the Medical Research Council, but the subsequent advent of restrictions upon the issue of official publications without immediate bearing upon the war effort made it impossible for the Council to publish it during the war. It has therefore been released for publication in this journal."

acuity was under 3/60 Snellen in more than ninety per cent. of all cases. In the remaining cases the field of vision was contracted. The findings at the examination were coded and the analysis of data carried out mechanically by means of punched cards.

3. The cases analysed came from twenty-three counties and large burghs in the South-West of Scotland—the greater proportion, as would be expected, coming from Glasgow. The population of the area at Census 1931 was 2,578,709 persons.

4. Information regarding the distribution of the cases in age, sex, nationality and occupation is given and is compared with that of the population in the area from which cases were drawn. The great majority were born in Scotland, but a higher proportion of Irish born were included than would have been expected from the distribution of this nationality in the population of the area. The mean ages of blindness and of onset of the condition causing blindness were 46·6 years and 34·5 years respectively, while the mean age at the time of examination was 55·3 years. In more than half the cases blindness occurred after the age of 50, while in almost two-thirds the condition causing blindness had commenced before that age. The first year of life shows the highest rate for the onset of blindness and the later years of life (from 70 onwards) the next greatest. Males were in excess of females, the proportion in the two sexes being 56·9 per cent. and 43·1 per cent. respectively. It is pointed out that information regarding age and sex distribution and occupation of the sample analysed and of the population at risk is essential for a proper comparison of statistics of the blind from different areas.

5. The sample analysed, while sufficiently representative of the blind examined at the Regional Clinic, cannot be accepted as completely representative of the blind population in Glasgow and South-West Scotland. Evidence is produced to show that social and economic factors played an important part in selecting the cases presenting themselves for examination.

6. The causes of blindness in the 3,219 cases examined have been classified in four different ways: (1) according to the cause of blindness affecting the *second* blind eye; (2) according to that affecting the *first* blind eye; (3) according to causes in relation to eyes as *distinct from cases, i.e.,* 6,438 eyes from 3,219 cases, and (4) when limited to those cases in which the same cause acted on both eyes. The first method, generally speaking, is the most satisfactory, although it tends to emphasise the importance of conditions such as Cataract and Myopia acting late in life and fails to give sufficient weight to injury as a cause of blindness.

The chief causes of blindness were Cataract 16·77 per cent., Myopia 16·34 per cent., Venereal Disease 13·95 per cent., Chronic

Septicaemia, Auto-intoxication etc. 10·72 per cent., Glaucoma 8·69 per cent., Congenital Anomalies and Abiotrophies 7·45 per cent., and Injury 6·42 per cent., which between them accounted for 80·34 per cent. of the cases.

The essential factor producing variations in the different methods of classification is Injury; thus, when the first eye is taken as a basis of classification 10·13 per cent. fall into this category, and if the second eyes only are considered the figure is 6·4 per cent., while when only those cases in which the same cause acted in both eyes are considered the proportion of cases due to Injury was only 5·8 per cent. Thus it appears that even in a highly industrial area such as South-West Scotland Injury plays a smaller part than has been frequently reported.

7. The cases falling under the various causes are corrected for age and sex as is done in the case of Death and similar rates. While no material change in the order of importance of the individual causes is produced in the present analysis, the importance of this standardisation is stressed as allowing satisfactory comparison with similar surveys.

8. A percentage distribution of cases in relation to cause of blindness does not bring sufficiently into relief the disabling effect and the economic importance of the various causes. Accordingly, the relative importance of the various causes from the point of view of the amount of blindness produced has been assessed. This has been done by calculating the " patient-years " of blindness from the duration of loss of sight for each cause and the number of cases in these causes. Assessment in this way shows that certain of the major causes of blindness were not responsible for the same amount of disablement as that produced by other numerically less frequent causes. Cataract, for instance, which was the most important condition on basis of frequency distribution fell to eighth place when considered in relation to " amount of blindness." On the other hand, Injury and Congenital Anomalies which were seventh and eighth respectively were raised to third and second places.

9. The mean age of onset and of blindness in regard to the various individual causes is given. It is shown that in cases becoming blind in the first four years of life ophthalmia neonatorum and congenital anomalies caused blindness in 68 per cent. In the school period (5-15 years) the incidence of blindness is lower, the chief causes being congenital syphilis and non-industrial injury. Syphilis is the most important single cause in the age group 16-29 years, but other important causes are injuries—including industrial—(17·28 per cent.), so-called chronic septicaemia or focal sepsis (16·28 per cent.), myopia (13·26 per cent.), Leber's

atrophy and pigmentary degeneration of the retina (9·49 per cent.). In the age group 30-49 years syphilis, chiefly acquired, is responsible for one-fifth of the cases, with myopia next in importance with 17·92 per cent. Injury is of less importance in this group, with 10·43 per cent. of cases. In the period 50-59 inflammatory conditions give place to degenerative. Myopia (22·68 per cent.), cataract (22·10 per cent.), glaucoma (12·71 per cent.) and vascular disease (4·95 per cent.) are the most important and are together responsible for 60 per cent. of the cases in this age group. Over 70 years cataract and glaucoma between them cause 67 per cent. of the cases.

10. Consideration of the relation of sex to cause of blindness showed that in only one condition, namely, diabetes, was there a significant excess of females. The incidence of males was significantly higher in abiotrophy, glaucoma, other primary defects, acquired syphilis, non-industrial injury, industrial injury, sympathetic ophthalmia, vascular disease and disease of central nervous system other than tumours.

11. As regards occupation miners and quarry workers show an outstandingly high incidence. The rate for these occupations corrected for age and sex was 39·03 per 10,000 of the population gainfully employed, as compared with 14·88 per 10,000 for all cases. Other occupations which showed high rates were textile workers (22·53 per 10,000) and metal workers (17·04 per 10,000), while lower than average rates were found for those employed in agricultural, professional, commercial and personal service occupations. When individual causes in relation to occupations were studied, no satisfactory explanation was obtained for these divergencies, although in miners the incidence of blindness from Injury is significantly in excess of the mean for this cause. It is of interest that Myopia does not reveal a significant excess in any occupational order.

12. Consideration of causes of blindness in relation to birthplace showed significantly higher rates in Irish-born for all causes with the single exception of congenital syphilis. These higher rates are in the main due to the fact that the Irish-born population showed a higher proportion of the male sex, and of persons over 50 years of age, than is found in the native population. At the same time occupation and social status play an important part.

13. The relationship of family history to the cause of blindness was studied, but revealed information of only limited value. This was due to the unreliable history obtained, to the fact that confirmation of a familial defect by actual examination was possible in few cases only and to the difficulty of allowing for the variation in size of the families concerned. However, 14·74 per cent. of all

cases gave a history of similar defect in other members of the family, while conditions possibly of a hereditary nature showed a positive history in 25·4 per cent.

14. Comparison is made of the results of the present analysis with a similar survey in England and Wales. The difficulties of comparison are indicated, but it is shown that the only important difference is an excess in South-West Scotland in the incidence of blindness resulting from what is called in the Medical Case Record Chronic Septicaemia, Focal Sepsis or Auto-intoxication, causing Uveitis.

15. Certain of the more important causes of blindness are considered in detail. Details are given in the text and in the appendix tables of age and sex distribution and the ocular manifestations attributed to the various causes. Particular reference is made to blindness from myopia, cataract, injury and syphilis.

In regard to myopia, the chief complications causing blindness were choroido-retinal degeneration, cataract and detachment of the retina, although the first named was present in almost all cases. Blindness occurring in myopes below the age of 40 was most commonly due to detachment of the retina, during middle life to choroido-retinal disease and in later ages to degenerative changes in the lens. It is noted that myopic detachment of the retina was more common in males.

Analysis of cases due to senile cataract showed that in 56·7 per cent. there was a possibility of restoration of vision by operation.

Particular attention has been paid to the association of syphilis and blindness because the Kahn diagnostic test was carried out in almost two-thirds of all the cases analysed. While syphilis was actually diagnosed as the cause of blindness in 10·8 per cent. of cases, evidence is produced to show that this disease may have played a part in a further 6·6 per cent. of the cases. Interstitial keratitis was the chief manifestation of congenital syphilis, the proportion of males to females being roughly 1 :2. Optic nerve atrophy was a predominant ocular defect in the acquired form.

It is worthy of note that a higher than average rate of positive Kahn tests was found in those blind from myopia and glaucoma.

Injury was directly or indirectly responsible for blindness in both eyes in 5·85 per cent. of all cases. It is suggested that the remaining cases attributed in part to injury would have become blind apart from injury as the causes affecting the uninjured eye were predominantly binocular. The great majority of industrial injuries, as would be expected, occurred between the ages of 30 and 50, and of non-industrial under the age of 16 years.

The high incidence of injury as a cause of blindness in miners as compared to that in metal workers is attributed to the frequency

in the former of explosions, falls and blows, resulting in head injury.

Sympathetic ophthalmia occurred as a sequel more often in the case of non-industrial injury. The majority of cases with this condition became blind under 30 years of age.

16. The defects or ocular diseases produced by the various causes are shown and the importance of this information for purposes of comparison with other similar surveys is indicated. In the appendix tables particulars are given of age and sex distribution, together with the mean age of onset and of blindness for the various defects. Six ocular defects, namely cataract, myopia, optic nerve atrophy, ulcer of the cornea, glaucoma and iridocyclitis, were responsible for almost three-quarters of the cases of blindness.

17. Consideration is also given to the end results of ocular disease. These may be considered the determining causes of blindness and are of importance in regard to the question of cure of blindness. Cataract, in one form or another, was the ultimate cause of blindness in one-third of all cases.

18. Particular attention has been paid to questions of prevention and cure of blindness under the headings "True Prevention," *i.e.*, prevention of actual causes of blindness, "Prevention by Treatment," either of general or of ocular disease and "Curative Measures."

The effects of true prevention cannot be satisfactorily assessed on the material available. Evidence is produced, however, from the incidence of congenital syphilis under one year in Glasgow (which has fallen from 335 cases in 1922 to 36 cases in 1937) and from the incidence of visual impairment of gonorrheal ophthalmia neonatorum (which has shown a fall from 112 cases in the period 1917-21 to 2 cases in period 1932-36), which suggests that general Public Health measures are having an effect in reducing blindness from these conditions.

The possible influence of eugenic measures on the incidence of blindness is discussed and it is demonstrated from the present series of cases that the probable reduction in blindness would not be more than 3 per cent.

As regards injury the present analysis would suggest that the effect of protective devices in industry will not produce any *marked* reduction in the incidence of blindness. This is because injuries due to flying particles etc. which can be prevented are mostly monocular, while a considerable body of blindness is due to explosions, falls or blows, which are not equally preventable.

20. Prevention by treatment is considered under two headings, namely, treatment of general disease of the body and of ocular disease. In regard to the first, the only figures available are those

for syphilis. Previous treatment had been obtained by 70 per cent. of the cases blind from this condition.

To ascertain the effect of prevention by treatment of ocular disease, the cases analysed were divided into two groups: (1) those in which the absence of previous treatment was unlikely to effect the ultimate progress of the condition, *e.g.*, cataract, congenital anomalies and systemic disease, and (2) those in which previous treatment was regarded of importance in preserving vision, *e.g.*, infectious and traumatic conditions, glaucoma, etc. The results showed that in the former group 24 per cent. had no previous special ophthalmic treatment, while in the other 8·5 per cent. fell into this category. It may be concluded that failure to obtain treatment had not such a serious or irretrievable effect on the numbers blind as is suggested by figures covering all cases, which show 15·7 per cent. without treatment and 12·5 per cent. with incomplete treatment.

Similar results are obtained when defects are analysed. Thus causes such as glaucoma, iridocyclitis and corneal ulcer, whose progress may be influenced by treatment, show a lower than average rate without treatment, while causes such as cataract, myopia, degenerative retinitis, optic nerve atrophy, whose course is not so likely to be benefited by treatment, show a higher than average rate.

21. When curative measures are considered in the present series of cases it is shown that, generally speaking, only opacities of the transparent media of the eye are susceptible to remedial measures. It was the opinion of the ophthalmologists that in 16·2 per cent. of total cases treatment might be expected to restore useful vision. In practically all of these cases the treatment recommended was of a surgical nature and the blindness in fully three-quarters was due to cataract.

The reasons for failure to obtain treatment are considered, and it is shown that patients with conditions associated with pain or sudden onset were more likely to seek advice, while those with disease of an insidious onset and arising late in life are less likely to do so. It would appear that the proximity of hospital facilities reduces the number without treatment. Thus, in the present series 19·4 per cent. of cases coming from localities with no hospital beds for treatment of eye disease had received no previous treatment, as compared with 13·4 per cent. from areas with this provision. The social factor is also of importance in this respect, the higher social orders showing a lower percentage in which further treatment was recommended. Again, Irish-born cases showed a significantly higher proportion without treatment.

When consideration is given to the number of persons who

underwent the treatment recommended at the Regional Clinic, it is shown that only some 14 per cent. completed the treatment advised. The majority of the others showed an unwillingness to carry out the treatment, partly from economic reasons. The fact that so many of the curable blind fail to undergo treatment would seem to favour the award of Blind Pensions only to incurable persons.

In conclusion, it may be pointed out that the present report, which is the first based on the scheme adopted by the Department of Health for Scotland for recording the information obtained in the course of medical examination of blind persons, has amply demonstrated the value of the scheme. This method has made it possible to obtain easily a full and comprehensive picture of blindness in many of its aspects. Further, the data are so arranged that comparison is possible with the findings of other workers.

We are indebted to Dr. A. S. M. Macgregor, Medical Officer of Health for Glasgow, for permission to make use of material available at the Blind Clinic, and to Dr. Peter McKinley for his valuable advice in regard to statistical matters.

We are also grateful to Medical Research Council for releasing this report for publication.

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TABLE A

Occupations engaged in prior to Blindness of the 3,219 Cases arranged according to Occupational Order used by the Registrar General in Census Returns and according to Social Categories used by the Registrar General in Decennial Supplement, 1921

OCCUPATIONAL ORDER	SOCIAL CLASS	OCCUPATION	MALES	FEMALES	TOTAL
I	4	Fishermen	6	—	6
II		Agricultural Occupations ...	42	11	53
	2	Farmers	4	—	4
	5	Gardeners' Labourers ...	11	—	11
	4	Agricultural Labourers ...	22	11	33
	5	Estate Workers	3	—	3
	4	Others	2	—	2
III		Mining and Quarrying Occupations	208	1	209
	4	Miners	196	1	197
	4	Other Workers	12	—	12
IV	4	Workers in Treatment of Non-Metalliferous Mine and Quarry Products ...		1	1
V	4	Makers of Bricks, Pottery and Glass	9	3	12
VI	3	Workers in Chemical Processes: Makers of Paints, Oils, etc.	16	2	18
VII		Metal Workers (not Electro-plate or Process Metals) ...	299	—	299
	3	Moulders and other Foundry Workers	34		34
	3	Smiths and Skilled Forge Workers	31		31
	3	Slotters, Millers, Turners, etc.	19		19
	4	Fitters and Millwrights ...	49		49
	3	Boilermakers, Platers, etc....	53		53
	3	Brass Finishers and Turners	3		3
	3	Constructional Engineers, Steel Erectors, etc. ...	2		2
	4	Mechanical Engineers ...	9		9
	3	Motor Mechanics	1		1
	3	Plumbers	10		10
	3	Riveters	4		4
	3	Tinsmiths, Sheet Metal Workers	8		8
	5	Other Metal Workers ...	76		76
IX		Electrical Apparatus Makers and Fitters	3		3
	3	Electrical Engineers ...	2		2
	3	Electricians	1		1
XI	4	Workers in Skins and Leather	7	—	7

TABLE A—*continued*

OCCUPATIONAL ORDER	SOCIAL CLASS	OCCUPATION	MALES	FEMALES	TOTAL
XII		Textile Workers	28	48	76
	3	Winders	1		1
	3	Weavers	3	17	20
	4	Other Textile Workers ...	24	31	55
XIII		Makers of Textile Goods and Articles of Dress	36	38	74
	3	Tailors, etc.	18	9	27
	3	Dress and Blouse Makers ...	—	9	9
	3	Boot and Shoe Makers ...	16	1	17
	4	Sewers, Stitchers, Sewing Machinists	—	8	8
	4	Other Workers	2	11	13
XIV		Makers of Foods, Drinks and Tobacco	21	3 —	24
	3	Bakers and Pastry Cooks ...	11	1	12
	3	Sugar Confectionery, Makers, Moulders, etc.	—	2	2
	4	Other Workers	10	—	10
XV		Workers in Wood and Furniture	59	2	61
	3	Cabinet Makers	8		8
	3	Carpenters and Joiners ...	23		23
	3	Coach and Carriage Builders	3		3
	3	Pattern Makers	1	1	2
	4	Sawyers	5		5
	3	Shipwrights and Boat and Barge Builders	3		3
	4	Wood Turners and Machinists	4		4
	5	Other Workers	12	1	13
XVI		Makers of and Workers in Paper and Cardboard, Bookbinders, etc.	3	2	5
	3	Cardboard Box Makers ...	3		3
	3	Bookbinders		2	2
XVII		Printers and Photographers ...	11	7	18
	3	Compositors	1		1
	3	Printing Machine Setters ...	7	2	9
	4	Other Workers	3	5	8
XVIII		Builders, Bricklayers, Stone and Slate Workers: Contractors	34		34
	2	Builders	2		2
	3	Bricklayers	7		7
	3	Plasterers	4		4
	3	Slaters and Tilers	4		4
	3	Masons	6		6
	5	Contractors' Labourers ...	4		4
	4	Other Workers	7		7

TABLE A—*continued*

OCCUPATIONAL ORDER	SOCIAL CLASS	OCCUPATION	MALES	FEMALES	TOTAL
XIX	3	Painters and Decorators ...	13	17	30
		French Polishers	2	6	8
XX		Workers in other Materials ...		2	2
	3	Workers in Rubber ...	—	— 2	2
XXI		Workers in Mixed or Undefined Materials	43		43
	3	Makers of Musical Instruments	28		28
	4	Employed in Gas, Electricity, etc.	15		15
XXII		Persons employed in Transport and Communication ...	162	4	166
	3	Railway Drivers, Firemen and Cleaners	1		1
	4	Railway Porters and Lampmen	10		10
	4	Other Railway Servants ...	33	1	34
	4	Drivers and Coachmen ...	42		42
	3	Motor Drivers	10		10
	3	Tram Drivers and Conductors	4		4
	3	Other Road Transport Workers	4		4
	3	Petty Officers, Seamen and Deck Hands	14		14
	4	Firemen, Trimmers, etc. ...	21		21
	5	Dock Labourers	14		14
	5	Messengers and Porters ...	4	1	5
	4	Other Workers in Transport	5	2	7
XXIII		Commercial, Finance and Insurance Occupations ...	100	27	127
	2	Proprietors, Managing Directors, etc.	14	3	17
	2	Brokers, Factors, Agents ...	2	1	3
	2	Commercial Travellers ...	14	—	14
	3	Salesmen, Shop Assistants...	37	14	51
	5	Hawkers	19	7	26
	2	Other Workers	14	2	16
XXIV	2	Persons employed in Public Administration and Defence	6	—	6
XXV		Professional Occupations ...	31	25	56
	3	Nurses and Midwives ...		9	9
	2	School Teachers	1	7	8
	2	Others	30	9	39
XXVI	3	Persons professionally engaged in Entertainment and Sport	3	—	3

TABLE A—*continued*

OCCUPATIONAL ORDER	SOCIAL CLASS	OCCUPATION	MALES	FEMALES	TOTAL
XXVII		Persons engaged in Personal Service	16	91	107
	3	Domestic Servants		45	45
	4	Barmen and Waiters ...	2	3	5
	4	Laundry Workers	—	14	14
	4	Caretakers, etc.	7	27	34
	4	Other Workers	7	2	9
XXVIII	2	Clerks and Draughtsmen; Typists	27	5	32
XXIX	3	Warehousemen, Storekeepers and Packers	33	6	39
XXX	3	Stationary Engine Drivers, Dynamo and Motor Attendants	18	—	18
XXXI		Other and Undefined Workers	228	3	231
	4	Timekeepers	10	—	10
	5	General Labourers ...	172	—	172
	4	Others	46	3	49
		Others	270	1,200	1,470
		Housewives		1,001	1,001
		Not employed prior to blindness—			
		In Blind Asylum	108	52	160
		At School	71	57	128
		Occupations not stated ...	91	90	181
		Total all Cases	1,732	1,487	3,219

TABLE 2

Percentage Distribution of Causes of Blindness according to Different Methods of Classification

CAUSES	CLASSIFICATION ACCORDING TO—							
	SECOND BLIND EYE ONLY		FIRST BLIND EYE ONLY		BOTH EYES		BOTH EYES SAME CAUSE	
	PERCENTAGE	NO. OF CASES	PERCENTAGE	NO. OF CASES	PERCENTAGE	NO. OF CASES	PERCENTAGE	NO. OF CASES
CONGENITAL AND UNDETERMINED CONDITIONS:								
Congenital	4·75	153	4·75	153	4·75	306	5·09	147
Abiotrophy	2·70	87	2·67	86	2·69	173	2·98	86
Tumours	0·12	4	0·19	6	0·16	10	0·14	4
Myopia	16·34	526	14·73	474	15·53	1,000	15·90	459
Other Refractions	0·03	1	0·22	7	0·12	8	—	—
Glaucoma	8·7	280	8·39	270	8·54	550	8·87	256
Cataract	16·77	540	14·69	473	15·73	1,013	15·15	437
Other Primary Defects ...	0·87	28	0·78	25	0·82	53	0·83	24
Total	50·29	1,619	46·41	1,494	48·35	3,113	48·96	1,413
INFECTIOUS AND TOXIC CONDITIONS:								
Exogenous—								
Ophthalmia Neonatorum ...	3·07	99	3·14	101	3·11	200	3·43	99
Trachoma	0·81	26	0·81	26	0·81	52	0·90	26
Local Infections	2·52	81	2·73	88	2·63	169	2·29	66
Other	0·09	3	0·09	3	0·09	6	0·07	2
Total	6·49	209	6·77	218	6·63	427	6·69	193
Endogenous—								
Gonorrhœa	0·06	2	0·06	2	0·06	4	0·07	2
Congenital Syphilis ...	4·72	152	4·72	152	4·72	304	5·20	150
Acquired Syphilis	6·09	196	6·03	194	6·06	390	6·55	189
Smallpox	0·19	6	0·22	7	0·20	13	0·21	6
Measles	0·87	28	1·06	34	0·96	62	0·97	28
Scarlet Fever	0·12	4	0·09	3	0·11	7	0·10	3
Others	0·03	1	0·03	1	0·03	2	0·03	1
Meningitis	1·21	39	1·18	38	1·19	77	1·32	38
Tubercle	0·62	20	0·62	20	0·62	40	0·69	20
Phlyctenular	2·61	84	2·77	89	2·69	173	2·84	82
Septicæmia, Acute ...	0·31	10	0·28	9	0·29	19	0·31	9
Septicæmia, Chronic ...	10·72	345	10·44	336	10·73	681	10·81	312
Other	0·96	31	1·09	35	1·03	66	1·07	31
Total	28·52	918	28·58	920	28·55	1,838	30·19	871

TABLE B—*continued*

CAUSES	CLASSIFICATION ACCORDING TO—							
	SECOND BLIND EYE ONLY		FIRST BLIND EYE ONLY		BOTH EYES		BOTH EYES SAME CAUSE	
	PERCENTAGE	NO. OF CASES	PERCENTAGE	NO. OF CASES	PERCENTAGE	NO. OF CASES	PERCENTAGE	NO. OF CASES
TRAUMATIC AND CHEMICAL CONDITIONS :								
Birth	0·09	3	0·09	3	0·09	6	0·10	3
Non-Industrial	0·87	28	3·48	112	2·17	140	*2·01	58
Industrial	2·52	81	5·03	162	3·77	243	*2·95	85
War	0·28	9	0·26	9	0·28	18	0·28	8
Not Ascertainable	0·47	15	1·06	34	0·76	49	*0·48	14
Sympathetic Ophthalmia ...	2·20	71	0·22	7	1·21	78	—	—
Chemico-toxic—Tobacco ...	0·12	4	0·12	4	0·12	8	0·14	4
Alcohol ...	0·03	1	—	—	0·02	1	—	—
Other ...	0·06	2	0·06	2	0·62	4	0·07	2
Total	6·65	214	10·35	333	8·50	547	6·03	174
SYSTEMIC DISEASE :								
Anæmia	0·03	1	0·03	1	0·03	2	0·03	1
Diabetes	1·34	43	1·34	43	1·34	86	1·49	43
Nephritis	0·16	5	0·16	5	0·16	10	0·17	5
Pregnancy	0·18	6	0·25	8	0·22	14	0·21	6
Vascular	3·11	100	2·55	82	2·83	182	2·74	79
Intracranial Neoplasm ...	1·12	36	1·12	36	1·12	72	1·25	36
Other Diseases of C.N.S. ...	1·15	37	1·15	37	1·15	74	1·25	36
Other General Diseases ...	0·25	8	0·25	8	0·25	16	0·28	8
Total	7·33	236	6·83	220	7·08	456	7·42	214
NOT CLASSIFIED	0·71	23	1·06	34	0·89	57	0·69	20
TOTAL	100·00	3,219	100·00	3,219	100·00	6,438	*100·00	2,885

* Cases of injury one eye complicated by sympathetic ophthalmia in the other eye have been included in these figures.

TABLE C

TABLE C

Causes of Blindness in the 3,219 Cases arranged according to Percentage Distribution and Rate per 10,000 of Population at Census, 1931, when Standardised for Age and Sex, together with Average Duration of Blindness and "Patient Years" of Blindness expressed as Percentage of Total Years Blindness

CAUSES OF BLINDNESS	NO. OF CASES	PERCENTAGE DISTRIBUTION		RATE PER 10,000 OF POPULATION AT CENSUS, 1931		AVERAGE DURATION OF BLINDNESS IN YEARS	"PATIENT YEARS" BLINDNESS AS PERCENTAGE OF TOTAL
		CRUDE PERCENTAGE	STANDARDISED FOR AGE AND SEX	CRUDE RATE	STANDARDISED FOR AGE AND SEX		
CONGENITAL AND UNDETERMINED CONDITIONS:							
Congenital Anomalies...	153	4·75	4·45	0·593	0·599	20·7	11·39
Abiotrophy	87	2·70	2·53	0·339	0·341	7·5	2·31
Tumour of Globe	4	0·12	0·12	0·016	0·017	8·7	0·12
Myopia	526	16·34	16·23	2·036	2·185	5·5	10·28
Other Errors of Refraction	1	0·03	0·03	0·004	0·004	54·5	0·19
Glaucoma	280	8·7	9·31	1·087	1·253	3·7	3·68
Cataract	540	16·77	18·19	2·094	2·448	2·9	5·56
Other Primary	28	0·87	0·80	0·109	0·107	7·4	0·76
Total	1,619	50·29	51·66	6·278	6·954	5·7	34·29
INFECTIOUS AND TOXIC CONDITIONS:							
Exogenous—							
Ophthalmia Neonatorum	99	3·07	2·87	0·383	0·386	28·7	10·08
Trachoma	26	0·81	0·81	0·101	0·109	3·6	0·33
Local Septic Infections	81	2·52	2·56	0·314	0·345	11·1	3·19
Other Local Septic Infections ...	3	0·09	0·14	0·012	0·019	8·9	0·09
Total	209	6·49	6·38	0·810	0·859	18·5	13·69
Endogenous—							
Gonorrhœa	2	0·06	0·06	0·008	0·008	38·3	0·27
Syphilis, Congenital	152	4·72	4·43	0·589	0·597	13·2	7·12
Syphilis, Acquired	196	6·09	5·84	0·760	0·787	5·5	3·82
Smallpox	6	0·19	0·18	0·023	0·025	8·1	0·17
Measles	28	0·87	0·81	0·108	0·109	21·7	2·16
Scarlet Fever	4	0·12	0·11	0·016	0·015	9·1	0·13
Other Infectious Disease	1	0·03	0·03	0·004	0·004	30·0	0·11
Meningitis	39	1·21	1·13	0·151	0·153	19·8	2·74

TABLE C—*continued*

CAUSES OF BLINDNESS	NO. OF CASES	PERCENTAGE DISTRIBUTION		RATE PER 10,000 OF POPULATION AT CENSUS, 1931		AVERAGE DURATION OF BLINDNESS IN YEARS	"PATIENT YEARS" BLINDNESS AS PERCENTAGE OF TOTAL
		CRUDE PERCENTAGE	STANDARDISED FOR AGE AND SEX	CRUDE RATE	STANDARDISED FOR AGE AND SEX		
INFECTIOUS AND TOXIC CONDITIONS:							
Endogenous—continued							
Tuberculosis	20	0·62	0·58	0·078	0·078	11·9	0·84
Phlyctenular Disease	84	2·61	2·53	0·326	0·341	14·6	4·35
Septicæmia, Acute	10	0·31	0·31	0·039	0·041	26·3	0·93
Septicæmia, Chronic	345	10·73	10·78	1·338	1·449	9·8	12·03
Other Infections	31	0·69	0·95	0·120	0·128	11·2	1·23
Total	918	28·53	27·74	3·560	3·735	11·1	35·90
TRAUMATIC AND CHEMICAL CONDITIONS:							
All Injury	207	6·44	6·20	0·803	0·834	15·34	11·27
Birth Injury...	3	0·09	0·08	0·012	0·010	8·6	0·09
Non-Industrial	28	0·87	0·83	0·109	0·112	15·0	1·49
Industrial	81	2·52	2·41	0·314	0·324	13·0	3·73
War	9	0·28	0·25	0·035	0·033	16·0	0·51
Not Ascertainable	15	0·47	0·48	0·058	0·064	12·3	0·65
Sympathetic Ophthalmia	71	2·21	2·15	0·275	0·291	18·95	4·78
Toxic, etc.	7	0·21	0·12	0·027	0·017	1·42	0·10
Total	214	6·65	6·32	0·830	0·851	15·39	11·37
SYSTEMIC DISEASE:							
Anæmia	1	0·03	0·03	0·004	0·004	1·0	0·003
Diabetes	43	1·34	1·24	0·167	0·167	1·0	0·15
Nephritis	5	0·15	0·14	0·019	0·019	2·0	0·03
Pregnancy	6	0·18	0·20	0·203	0·027	15·0	0·32
Vascular	100	3·11	3·24	0·388	0·435	2·1	0·74
Intracranial Neoplasm	36	1·12	1·06	0·140	0·142	2·4	0·31
C.N.S. Disease	37	1·15	1·09	0·143	0·147	13·55	1·79
Other General Disease	8	0·25	0·21	0·031	0·029	7·8	0·22
Total	236	7·33	7·21	0·915	0·970	4·53	3·56
NOT CLASSIFIED	23	0·71	0·69	0·089	0·093	14·8	1·21
ALL CASES	3,219	100·00	100·00	12·483	13·462	8·7	100·00

TABLE D

Various Causes of Blindness arranged according to the Mean Ages of Onset of the Condition leading to Blindness, of Onset of Actual Blindness and of Examination

(For the purposes of determining the mean ages the mid point of the age group 70 + years has been taken as 75 years, it having been found by trial that no serious error resulted by making this assumption.)

CAUSES OF BLINDNESS	NO. OF CASES	MEAN AGE OF ONSET OF CONDITION	STANDARD DEVIATION	MEAN AGE OF BLINDNESS	STANDARD DEVIATION	MEAN AGE AT EXAMINATION
CONGENITAL AND UNDETERMINED CONDITIONS:						
Congenital	153	1·0	—	14·4	21·74	35·1
Abiotrophy	87	20·8	12·4	39·5	13·85	47·0
Tumours	4	24·0	—	29·0	—	37·7
Myopia	526	16·16	17·29	52·4	13·35	57·9
Other Errors of Refraction ...	1	10·50	—	10·5	—	65·0
Glaucoma	280	58·96	9·38	61·9	14·66	65·6
Cataract	540	60·5	13·64	65·6	9·72	68·5
Other Primary Ocular Defects ...	28	39·6	15·9	43·3	16·82	50·7
Total	1,619	37·6	—	53·9	—	59·6
INFECTIOUS AND TOXIC CONDITIONS:						
Exogenous—						
Ophthalmia Neonatorum ...	99	1·0	—	9·0	16·64	37·7
Trachoma	26	24·4	17·21	49·98	17·86	53·6
Local Infections	81	41·1	22·15	51·28	19·18	62·3
Other	3	28·0	—	39·0	—	50·0
Total	209	19·4	—	30·90	27·87	49·4
Endogenous—						
Gonorrhœa	2	16·7	—	16·7	—	55·0
Syphilis, Congenital	152	14·1	10·4	25·32	16·88	38·49
Syphilis, Acquired	196	42·23	12·24	46·59	11·83	52·10
Smallpox	6	16·6	—	47·00	—	55·08
Measles	28	5·8	3·84	16·76	22·91	38·5
Scarlet Fever	4	8·6	—	19·7	—	28·8
Others	1	35·0	—	35·0	—	65·0
Meningitis	39	10·3	11·35	12·9	15·39	32·7
Tuberculosis	20	14·3	9·26	26·7	15·00	38·6
Phlyctenular	84	10·0	8·14	35·0	20·49	49·6
Septicæmica, Acute	10	24·25	—	25·25	—	51·6
Septicæmica, Chronic ...	345	33·9	26·92	46·3	18·54	56·1
Other	31	22·1	—	37·4	—	48·6
Total	918	28·5	—	38·3	—	49·41

TABLE D—*continued*

CAUSES OF BLINDNESS	NO. OF CASES	MEAN AGE OF ONSET OF CONDITION	STANDARD DEVIATION	MEAN AGE OF BLINDNESS	STANDARD DEVIATION	MEAN AGE AT EXAMINATION
TRAUMATIC AND CHEMICAL CONDITIONS :						
All Injury	207	34·26	10·77	37·37	18·38	52·76
Birth	3	1·0	—	1·0	—	9·6
Non-Industrial...	28	31·6	35·55	35·5	22·54	50·5
Industrial	81	37·9	12·53	40·7	14·56	53·7
War	9	26·7	—	27·9	—	43·9
Not Ascertainable	15	40·3	—	47·2	—	59·5
Sympathetic Ophthalmia ...	71	32·16	15·45	34·95	20·76	53·9
Tobacco	4	65·0	—	65·0	—	67·0
Alcohol	1	—	—	—	—	55·0
Toxic, etc.	2	23·0	—	34·0	—	45·0
Total	214	34·7	—	37·8	—	52·9
SYSTEMIC DISEASE :						
Anæmia	1	65·0	—	65·0	—	65·0
Diabetes	43	56·5	6·11	61·1	11·74	62·1
Nephritis	5	51·0	—	51·0	—	53·0
Pregnancy	6	36·6	—	46·6	—	61·6
Vascular	100	60·8	8·25	63·58	9·57	65·7
Intracranial Neoplasm ...	36	34·5	18·97	36·09	19·1	38·5
Diseases of Central Nervous System	37	30·8	21·91	32·5	22·31	46·05
Other General Infections ...	8	25·3	—	30·5	—	38·3
Total	236	49·71	—	52·22	—	56·75
UNCLASSIFIED :	23	11·6	—	33·7	—	48·5
Total	3,219	34·49	—	46·6	—	55·3

TABLE E

TABLE E

Cases arranged according to Age Groups of Onset, Blindness, and Examination

CAUSES	AGE GROUP ONSET											AGE GROUP BLINDNESS										AGE GROUP EXAMINATION									
	CASES	Not Stated	0–1	1–4	5–15	16–29	30–39	40–49	50–59	60–69	70+	Not Stated	0–1	1–4	5–15	16–29	30–39	40–49	50–59	60–69	70+	0–1	1–4	5–15	16–29	30–39	40–49	50–59	60–69	70+
			0	2	3	4	5	6	7	8	9		0	2	3	4	5	6	7	8	9	0	2	3	4	5	6	7	8	9
0. Congenital ...	153	—	149	—	—	—	—	—	—	—	—	—	88	10	12	7	5	12	12	5	2	1	8	28	43	14	20	24	12	3
1. Abiotrophy ...	87	1	3	6	25	35	8	7	2	—	—	—	—	1	3	25	12	21	20	5	—	—	—	—	11	18	19	25	12	2
2. Tumours	4	—	—	2	—	—	1	—	1	—	—	—	—	2	—	—	—	—	2	—	—	—	—	2	—	—	—	—	2	—
3. Myopia	526	7	63	38	308	25	18	16	29	16	6	9	—	—	8	35	44	87	171	145	27	—	—	3	20	24	56	155	199	69
4. Other Refractions	1	—	—	—	1	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
5. Glaucoma ...	280	1	—	—	1	5	10	41	77	98	47	1	—	—	—	2	10	22	66	116	62	—	—	—	1	2	11	57	103	106
6. Cataract	540	2	2	—	5	10	24	44	127	191	135	2	—	1	—	—	7	30	81	218	201	—	—	—	1	2	13	55	189	280
7. Other Primary ...	28	—	—	—	1	8	5	8	2	3	1	—	—	—	1	6	4	8	4	3	2	—	—	—	4	4	5	4	8	3
Total	1,619	11	221	46	341	83	66	116	238	308	189	12	88	14	25	75	82	180	356	492	295	1	8	33	80	64	124	320	526	463
10. Ophthalmia Neon	99	—	65	31	1	—	—	2	—	—	—	—	48	31	2	3	6	5	2	1	1	—	2	13	17	22	13	24	7	1
11. Trachoma ...	26	—	—	1	12	4	4	—	5	—	—	—	—	—	1	3	4	3	6	6	3	—	—	—	2	5	4	3	7	5
12. Local Infection ...	81	—	1	5	15	5	9	10	16	14	6	—	1	—	10	1	8	7	20	22	12	—	—	—	1	5	4	20	25	26
13. Other	2	—	—	—	1	—	—	1	—	—	—	—	—	—	—	1	—	—	1	—	—	—	—	—	—	—	—	1	1	—
14.	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—
Total	209	—	66	37	29	10	13	13	21	14	6	—	49	31	13	8	19	15	29	29	16	—	2	13	20	32	22	49	39	32
15. Gonorrhœa ...	2	—	—	—	1	1	—	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	2	—	—
16. Syphilis, Congenital	152	—	9	14	92	24	5	6	1	1	—	1	3	7	51	37	16	22	12	2	1	—	1	11	43	28	26	28	11	4
17. Syphilis, Acquired	196	1	1	—	1	20	65	59	37	10	2	1	—	—	—	10	50	63	48	17	7	—	—	—	2	29	57	59	32	17
18. Smallpox ...	6	—	—	1	4	—	—	—	1	—	—	—	—	1	—	—	1	1	1	2	—	—	—	1	—	—	1	1	1	2
19. Measles	28	—	1	16	11	—	—	—	—	—	—	—	1	15	5	1	1	—	2	2	1	—	—	4	7	3	6	3	4	1
20. Scarlet	4	—	—	1	3	—	—	—	—	—	—	—	—	1	2	—	—	—	1	—	—	—	—	1	—	1	1	—	1	—
22. Others	1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—
23. Meningitis ...	39	1	6	12	13	4	1	2	—	—	—	—	4	12	14	3	2	4	—	—	—	—	2	7	12	3	4	9	1	1
24. Tubercle ...	20	—	—	3	11	4	2	—	—	—	—	—	—	1	4	7	6	—	1	1	—	—	—	1	6	4	3	4	2	—
25. Phlyctenular ...	84	—	1	26	48	6	1	2	—	—	—	—	—	7	16	12	9	14	16	10	—	—	—	3	8	12	12	22	24	3
26. Septicæmia, Acute	10	—	1	2	2	—	1	4	—	—	—	—	1	2	2	—	1	3	1	—	—	—	—	—	2	1	1	—	6	—
27. Septicæmia, Chronic	345	3	4	8	51	64	50	52	53	45	15	1	3	4	18	43	52	60	72	64	28	—	1	3	16	33	43	98	86	65
28. Other	31	1	3	8	4	4	3	4	4	—	—	—	—	3	5	3	7	1	4	8	—	—	1	1	5	3	4	6	6	5
Total	918	6	26	91	241	127	129	129	96	56	17	3	12	53	118	117	146	168	158	106	37	—	5	32	101	117	158	232	175	98

TABLE E—*continued*

CAUSES	CASES	AGE GROUP ONSET										AGE GROUP BLINDNESS										AGE GROUP EXAMINATION									
		Not Stated	0–1	1–4	5–15	16–29	30–39	40–49	50–59	60–69	70+	Not Stated	0–1	1–4	5–15	16–29	30–39	40–49	50–59	60–69	70+	0–1	1–4	5–15	16–29	30–39	40–49	50–59	60–69	70+
		0	2	3	4	5	6	7	8	9		0	2	3	4	5	6	7	8	9		0	2	3	4	5	6	7	8	9	
30. Birth	3	—	3	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	2	—	1	—	—	—	—	—	—
31. Non-Industrial ...	28	—	—	3	10	2	1	4	2	5	1	—	—	1	7	6	2	3	2	6	1	—	—	—	3	3	7	6	8	1
32. Industrial ...	81	—	—	—	—	24	21	23	9	4	—	—	—	—	—	18	19	27	10	7	—	—	—	—	4	9	17	23	18	10	—
33. War	9	—	—	—	—	7	1	1	—	—	—	—	—	—	—	7	1	—	1	—	—	—	—	—	—	2	6	1	—	—	—
34. Not Ascertained	15	—	—	1	1	2	4	2	2	2	1	—	—	—	1	1	3	3	3	3	1	—	—	—	1	—	1	6	3	4	—
35. Sympathetic ...	71	—	1	—	22	14	6	13	6	7	2	—	—	1	19	13	6	12	10	7	3	—	—	3	4	6	4	25	23	6	—
36. Tobacco	4	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	3	1	—
37. Alcohol	1	1	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
39.	2	—	—	—	—	2	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	1	—	1	—	—	—
Total	214	1	4	4	33	51	33	43	19	22	4	1	3	2	27	46	31	46	26	27	5	—	2	3	13	21	35	63	55	22	—
50. Anæmia	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1	—	—
51. Diabetes ...	43	—	—	—	—	2	—	4	21	15	1	—	—	—	—	2	—	3	8	24	6	—	—	—	2	—	3	5	26	7	—
52. Nephritis ...	5	—	—	—	—	—	1	1	2	1	—	—	—	—	—	—	1	1	2	1	—	—	—	—	—	1	—	3	1	—	—
53. Pregnancy ...	6	—	—	—	—	—	5	1	—	—	—	—	—	—	—	—	3	1	1	—	1	—	—	—	—	—	1	1	3	1	—
54. Vascular ...	100	1	—	—	—	—	3	11	27	41	17	1	—	—	—	—	1	6	24	43	25	—	—	—	—	1	1	21	44	33	—
55. Intr. Neoplasm ...	36	—	1	1	5	9	4	9	3	3	1	—	1	1	4	8	6	7	5	3	1	—	1	5	5	8	6	6	4	1	—
56. C.N.S. Disease ...	37	—	2	3	8	6	4	6	4	2	2	—	2	2	8	7	2	7	4	3	2	—	1	2	5	1	9	13	4	2	—
60. Other General ...	8	—	1	—	2	2	2	—	—	1	—	—	—	—	3	1	2	—	1	1	—	—	—	3	—	—	2	1	2	—	—
Total	236	1	4	4	15	19	19	32	57	64	21	1	3	3	15	18	15	25	45	76	35	—	2	10	12	11	22	50	85	44	—
70. Not Classified ...	23	1	1	1	9	1	3	1	4	2	—	1	1	1	7	—	3	1	7	2	—	—	—	2	5	—	1	7	5	3	—
Total	3,219	20	318	185	670	291	263	334	435	466	237	18	156	104	205	264	296	435	621	732	388	1	19	93	231	245	362	721	885	662	1

TABLE F

Distribution of Groups of Causes in Age Groups

0–4 YEARS			5–15 YEARS			16–29 YEARS			30–49 YEARS			50–69 YEARS			70 YEARS AND OVER		
CAUSE	NO. OF CASES	PER-CENT-AGE	CAUSE	NO. OF CASES	PER-CENT-AGE	CAUSE	NO. OF CASES	PER-CENT-AGE	CAUSE	NO. OF CASES	PER-CENT-AGE	CAUSE	NO. OF CASES	PER-CENT-AGE	CAUSE	NO. OF CASES	PER-CENT-AGE
Congenital, etc. ...	102	39·23	Endogenous Infections	118	57·56	Endogenous Infections	117	44·31	Endogenous Infections	314	42·95	Congenital, etc. ...	848	62·68	Congenital, etc. ...	295	76·03
Exogenous Infections	80	30·70	Injury ...	27	13·17	Congenital, etc. ...	75	28·41	Congenital, etc. ...	262	35·84	Endogenous Infections	264	19·51	Endogenous Infections	37	9·54
Endogenous Infections	65	25·00	Congenital, etc. ...	25	12·19	Injury ...	46	17·42	Injury ...	77	10·53	General Diseases	121	8·94	General Diseases	35	9·02
General Diseases	6	2·30	General Diseases	15	7·32	General Diseases	18	6·81	General Diseases	40	5·47	Exogenous Infections	58	4·29	Exogenous Infections	16	4·12
Injury ...	5	1·92	Exogenous Infections	13	6·34	Exogenous Infections	8	3·03	Exogenous Infections	34	4·65	Injury ...	53	3·92	Injury ...	5	1·29
Not Classified	2	0·76	Not Classified	7	3·41	Not Classified	—	—	Not Classified	4	0·55	Others ...	9	0·66	Others ...	—	—
Total ...	260	100·00	Total ...	205	100·00	Total ...	264	100·00	Total ...	731	100·00	Total ...	1,353	100·00	Total ...	388	100·00

TABLE G

Distribution of Principal Causes of Blindness arranged in Certain Age Groups

0–5 YEARS			5–15 YEARS			16–29 YEARS			30–49 YEARS			50–69 YEARS			70 YEARS AND OVER		
CAUSES	NO. OF CASES	PER-CENT-AGE	CAUSES	NO. OF CASES	PER-CENT-AGE	CAUSES	NO. OF CASES	PER-CENT-AGE	CAUSES	NO. OF CASES	PER-CENT-AGE	CAUSES	NO. OF CASES	PER-CENT-AGE	CAUSES	NO. OF CASES	PER-CENT-AGE
Congenital Anomalies	98	37·7	Syphilis, Congenital	51	24·87	Syphilis ...	47	17·80	Syphilis ...	151	20·65	Myopia ...	316	23·36	Cataract ...	201	51·80
Ophthalmia Neonatorum	79	30·4	Injury ...	27	13·16	Congenital	(37)	(14·01)	Acquired	(113)	(15·45)	Cataract ...	299	22·10	Glaucoma	63	16·24
Infectious Disease ...	18	6·92	Non-Industrial	(8)		Acquired	(10)	(3·78)	Congenital	(38)	(5·20)	Glaucoma	182	13·45	Chronic Septicæmia	28	7·22
Measles ...	(16)	(6·15)	Sympathetic Ophthalmia	(19)		Injury ...	45	17·05	Myopia ...	131	17·92	Chronic Septicæmia	136	10·05	Myopia ...	27	6·96
Meningitis	16	6·15	Chronic Septicæmia	18	8·78	Industrial	(18)	(6·82)	Chronic Septicæmia	112	15·30	Syphilis ...	79	5·83	Vascular Disease ...	25	6·44
Syphilis ...	10	3·8	Phlyctenular Disease ...	16	7·80	War ...	(7)	(2·65)	Injury ...	76	10·40	Acquired	(65)	(4·80)	Local Infections	12	3·09
Congenital	(10)	(3·8)	Meningitis...	14	6·83	Non-Industrial	(6)	(2·27)	Industrial	(46)	(6·29)	Congenital	(14)	(1·03)	Syphilis ...	8	2·06
Phlyctenular Disease ...	7	2·7	Congenital Anomalies	12	5·85	Sympathetic	(13)	(4·92)	Non-Industrial	(5)	(0·68)	Vascular Disease ...	67	4·95	Diabetes ...	6	1·55
Chronic Septicæmia	7	2·7	Local Infection...	10	4·87	Chronic Septicæmia	43	16·28	Not Ascertained ...	(6)	(0·82)	Injury ...	49	3·62	Injury ...	5	1·29
Injury ...	5	1·9	Myopia ...	8	3·90	Myopia ...	35	13·26	Sympathetic	(18)	(2·46)	Industrial	(17)	(1·26)	Others ...	13	3·35
Birth ...	(3)		Disease of Central Nervous System	8	3·90	Abiotrophy	25	9·49	Cataract ...	37	5·06	Non-Industrial	(8)	(0·59)			
Non-Industrial	(1)					Phlyctenular Disease ...	12	4·55	Abiotrophy	33	4·51	Not Ascertained ...	(6)	(0·44)			
Sympathetic Ophthalmia	(1)					Intracranial Neoplasm	8	3·03	Glaucoma ...	32	4·38	Sympathetic	(17)	(1·26)			
						Congenital Anomalies	7	2·65	Phlyctenular Disease ...	23	3·15	Local Infections	42	3·10			
						Tuberculosis	7	2·65	Congenital Anomalies	17	2·33	Diabetes ...	32	2·36			

TABLE G—*continued*

0–5 YEARS			5–15 YEARS			16–29 YEARS			30–49 YEARS			50–69 YEARS			70 YEARS AND OVER		
CAUSES	NO. OF CASES	PER-CENT-AGE	CAUSES	NO. OF CASES	PER-CENT-AGE	CAUSES	NO. OF CASES	PER-CENT-AGE	CAUSES	NO. OF CASES	PER-CENT-AGE	CAUSES	NO. OF CASES	PER-CENT-AGE	CAUSES	NO. OF CASES	PER-CENT-AGE
Disease of Central Nervous System	4	1·5	Infectious Disease	7	3·41	Disease of Central Nervous System	7	2·65	Local Infections	15	2·05	Phlyctenular Disease ...	26	1·92			
Acute Septicæmia	3		Measles	(5)	(2·44)	Others ...	28	10·61	Intracranial Neoplasm	13	1·78	Abiotrophy	25	1·85			
Intracranial Neoplasm	2		Tuberculosis	4	1·95				Ophthalmia Neonatorum	11	1·50	Congenital Anomalies	17	1·26			
Others ...	10		Intracranial Neoplasm	4	1·95				Diseases of Central Nervous System	9	1·23	Trachoma	12	0·89			
			Abiotrophy	3	1·46				Trachoma	7	0·95	Intracranial Neoplasm	8	0·59			
			Others ...	23	11·22				Vascular Disease ...	7	0·95	Fevers ...	8	0·59			
									Meningitis...	6	0·82	Disease of Central Nervous System	7	0·52			
									Tuberculosis	6	0·82	Others ...	48	3·55			
									Fevers ...	4	0·54						
									Others ...	41	5·61						
Total ...	260		Total ...	205		Total ...	264		Total ...	731		Total ...	1,353		Total ...	388	

TABLE H

Crude Percentage, and Percentage when corrected for Age at Examination, of Males in the Various Causes of Blindness, together with the Calculated Differences of these Percentages from that of Males in the Population of Glasgow and South-West Scotland

CAUSES OF BLINDNESS	NUMBER OF CASES	PERCENTAGE MALES	STANDARD ERROR $\sqrt{pq/n}$	DIFFERENCE FROM PERCENTAGE MALES IN AREA (48.67%)	DIFFERENCE FROM POPULATION DIVIDED BY STANDARD ERROR	PERCENTAGE MALES STANDARDISED FOR AGE AT EXAMINATION	STANDARD ERROR $\sqrt{pq/n}$	DIFFERENCE FROM PERCENTAGE MALES IN AREA	DIFFERENCE FROM PERCENTAGE MALES IN AREA DIVIDED BY STANDARD ERROR
A. CONGENITAL AND UNDETERMINED CONDITIONS:									
Congenital Anomalies	153	54·24	±4·04	+5·57	+1·38	55·14	±4·02	+6·47	+1·61
Abiotrophy	87	77·01	±5·36	+28·34	+5·29	76·19	±4·57	+27·42	+6·00
Tumour of Globe	4	50·00	—	—	—	—	—	—	—
Myopia	526	50·95	±2·18	+2·28	+1·05	52·44	±2·18	+3·77	+1·73
Other Errors of Refraction	1	100·00	—	—	—	—	—	—	—
Glaucoma	280	56·07	±2·99	+7·40	+2·47	59·45	±2·93	+10·78	+3·68
Cataract	540	47·59	±2·15	—1·08	+0·50	52·22	±2·15	+3·55	+1·21
Other Primary	28	67·86	±9·45	+19·19	+2·03	69·52	±8·70	+20·85	+2·40
Total	1,619	52·75	±1·24	+4·08	+3·29	55·45	±1·23	+6·78	+5·51
B. INFECTIOUS AND TOXIC CONDITIONS:									
Exogenous—									
Ophthalmia Neonatorum	99	47·47	±5·02	—1·20	—0·24	49·03	±5·02	+0·36	+0·07
Trachoma	26	50·00	±9·80	+1·33	+0·14	50·81	±9·80	+2·14	+0·22
Local Septic Infections	81	44·44	±5·55	—4·23	—0·76	47·78	±5·55	—0·89	—0·14
Other Infections	3	100·00	—	—	—	—	—	—	—
Total	209	47·37	±3·46	—1·30	—0·38	49·47	±3·46	+0·80	+0·13
Endogenous—									
Gonorrhœa	2	50·00	—	—	—	—	—	—	—
Syphilis, Congenital	152	43·42	±4·05	—5·25	—1·30	43·03	±4·02	—5·73	—1·65
Syphilis, Acquired	196	72·45	±3·57	+23·78	+6·66	78·39	±2·94	+29·72	+10·11
Smallpox	6	16·67	—	—	—	—	—	—	—
Measles	28	39·29	±9·45	—9·38	—0·99	40·70	±9·28	—7·97	—0·86
Scarlet Fever	4	75·00	—	—	—	—	—	—	—
Other Specific Fevers	1	0·0	—	—	—	—	—	—	—
Meningitis	39	33·33	±8·00	—15·37	—1·92	34·24	±7·60	—14·43	—1·89
Tuberculosis	20	50·00	±11·18	+1·33	+0·12	52·10	±11·18	+3·43	+0·31

TABLE H—*continued*

Tuberculosis	20	50·00	±11·18	+1·33	+0·12	52·10	±11·18	+3·43	+0·31

TABLE H—*continued*

CAUSES OF BLINDNESS	NUMBER OF CASES	PERCENTAGE MALES	STANDARD ERROR $\sqrt{pq/n}$	DIFFERENCE FROM PERCENTAGE MALES IN AREA (48.67%)	DIFFERENCE FROM POPULATION DIVIDED BY STANDARD ERROR	PERCENTAGE MALES STANDARDISED FOR AGE AT EXAMINATION	STANDARD ERROR $\sqrt{pq/n}$	DIFFERENCE FROM PERCENTAGE MALES IN AREA	DIFFERENCE FROM PERCENTAGE MALES IN AREA DIVIDED BY STANDARD ERROR
B. INFECTIOUS AND TOXIC CONDITIONS:									
Endogenous—continued									
Phlyctenular Conditions ...	84	42·86	±5·45	−5·81	−1·07	43·96	±5·42	−4·61	−0·85
Septicæmia, Acute	10	40·00	—	—	—	—	—	—	—
Septicæmia, Chronic	345	45·80	±2·69	−2·87	−1·07	52·03	±2·69	+3·36	+1·25
Other General Infections ...	31	51·61	±8·98	+2·94	+0·33	53·82	±8·95	+5·15	+0·58
Total	918	50·22	±1·65	+1·55	+0·94	52·48	±1·65	+3·81	+2·31
C. TRAUMATIC AND CHEMICAL CONDITIONS:									
Birth Trauma	3	100·00	—	—	—	—	—	—	—
Non-Industrial Trauma	28	78·57	±9·45	+29·90	+3·16	79·83	±7·58	+31·16	+4·11
Industrial Trauma	81	98·77	±5·55	+50·10	+9·03	98·81	±1·20	+50·14	+41·78
War Trauma	9	100·00	—	—	—	—	—	—	—
Trauma—Category not ascertained	15	73·33	—	—	—	—	—	—	—
Sympathetic Ophthalmia	71	63·38	±5·93	+14·71	+2·48	64·47	±5·68	+15·80	+2·78
Chemico-toxic	7	85·71	—	—	—	—	—	—	—
Total	214	82·24	±3·42	+33·57	+9·82	83·07	±2·56	+34·40	+13·44
D. SYSTEMIC DISEASES:									
Anæmia	1	100·00	—	—	—	—	—	—	—
Diabetes	43	13·95	±7·62	−34·72	−4·56	15·87	±5·57	−32·80	−5·88
Nephritis	5	100·00	—	—	—	—	—	—	—
Pregnancy	6	—	—	—	—	—	—	—	—
Vascular Disease	100	74·00	±5·00	+25·33	+5·06	78·22	±4·13	+29·55	+7·15
Intracranial Neoplasm	36	50·00	±8·33	+1·33	+0·16	54·31	±8·30	+5·64	+0·68
Other Diseases of Central Nervous System	37	67·57	±8·22	+19·90	+2·30	64·42	±7·87	+15·75	+2·00
Other General Diseases	8	50·00	—	—	—	—	—	—	—
Total	236	56·35	±3·25	+7·68	+2·36	59·27	±3·20	+10·60	+3·31
NOT CLASSIFIED	23	47·82	—	—	—	—	—	—	—
Total	3,219	53·87	±0·88	+5·20	+5·91	56·35	±0·87	+7·68	+8·82

TABLE J

Various Causes in Relation to some Occupational Orders as a Percentage and a Rate per 10,000 *of Population at Risk*

OCCUPATIONAL ORDER	MYOPIA			GLAUCOMA			CATARACT			ACQUIRED SYPHILIS			CHRONIC SEPTICÆMIA			VASCULAR DISEASE			INJURY			OPHTHALMIA NEONATORUM			OTHER CAUSES			ALL CAUSES		
	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000
Agricultural Occupations ... ... (II)	8	15·09	1·90	3	5·66	0·71	12	22·64	2·86	1	1·89	0·24	7	13·21	1·67	—	—	—	5	9·43	1·19	—	—	—	17	32·08	4·05	53	100·00	12·62
Mining and Quarrying Occupations... (III)	38	18·18	5·27	13	6·22	1·80	40	19·14	5·55	13	6·22	1·80	19	9·09	2·63	11	5·26	1·53	38	18·18	5·27	—	—	—	37	17·70	5·13	209	100·00	28·98
Metal Workers ... (VII)	34	11·37	2·34	38	12·71	2·61	61	20·40	4·20	36	12·04	2·48	30	10·03	2·06	17	5·69	1·17	33	11·04	2·27	2	—	0·14	48	16·05	3·30	299	100·00	20·56
Textile Workers ... (XII)	16	21·05	3·69	7	9·21	1·62	13	17·11	3·00	4	5·26	0·92	15	19·74	3·46	1	1·32	0·23	3	3·95	0·69	1	1·32	0·23	16	21·05	3·69	76	100·00	17·55
Makers of Textile Goods ... ... (XIII)	19	25·68	5·16	4	5·41	1·09	14	18·92	3·80	4	5·41	1·09	9	12·16	2·45	1	1·35	0·27	1	1·35	0·27	1	1·35	0·27	21	28·38	5·71	74	100·00	20·11
Workers in Wood and Furniture ... (XV)	10	16·39	2·81	13	21·31	3·66	13	21·31	3·66	7	11·48	1·97	3	4·92	0·81	1	1·64	0·28	4	6·56	1·13	2	3·28	0·56	8	13·11	2·25	61	100·00	17·16
Workers in Transport & Communication (XXII)	24	14·46	2·21	17	10·24	1·56	32	19·28	2·94	15	9·04	1·38	19	11·45	1·75	10	6·02	0·92	16	9·64	1·47	1	0·60	0·09	32	19·28	2·94	166	100·00	15·25

TABLE J—*continued*

OCCUPATIONAL ORDER	MYOPIA			GLAUCOMA			CATARACT			ACQUIRED SYPHILIS			CHRONIC SEPTICÆMIA			VASCULAR DISEASE			INJURY			OPHTHALMIA NEONATORUM			OTHER CAUSES			ALL CAUSES		
	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000	NO. OF CASES	PER-CENTAGE	RATE PER 10,000
Commercial, etc., Occupations ... (XXIII)	27	21·26	1·94	12	9·45	0·86	12	9·45	0·86	7	5·51	0·50	10	7·87	0·72	2	1·57	0·14	11	8·66	0·79	5	3·94	0·36	41	32·28	2·95	127	100·00	9·13
Professional Occupations ... ... (XXV)	8	14·29	1·71	6	10·71	1·28	5	8·93	1·07	—	—	—	4	7·14	0·86	—	—	—	2	3·57	0·43	10	17·86	2·14	21	37·5	4·49	56	100·00	11·98
Personal Service Occupations ... (XXVII)	20	18·69	1·78	9	8·41	0·80	16	14·95	1·43	9	8·41	0·80	16	14·95	1·43	4	3·74	0·36	4	3·74	0·36	3	2·80	0·27	26	24·30	2·32	107	100·00	9·55
Other and Undefined Workers ... ... (XXXI)	48	20·78	3·70	21	9·09	1·62	38	16·45	2·93	20	8·66	1·54	21	9·09	1·62	8	3·46	0·62	17	7·36	1·31	5	2·16	0·39	53	22·94	4·09	231	100·00	17·81
All other Occupations ...	58	20·00	2·22	36	12·41	1·38	32	11·03	1·23	33	11·38	1·27	30	10·34	1·15	16	5·52	0·61	19	6·55	0·73	1	0·34	0·04	65	22·41	2·49	290	100·00	11·12
Total gainfully Employed ...	310	17·72	2·64	179	10·23	1·53	288	16·17	2·46	149	8·52	1·27	183	10·45	1·56	71	4·06	0·61	153	8·78	1·31	31	1·77	0·26	385	22·01	3·28	1,749	100·00	14·92

TABLE K

Proportion of Cases of Different Nationalities in each Cause as a Percentage of Cases in each Cause.

CAUSES	TOTAL CASES	SCOTS CASES	SCOTS %	ENGLISH CASES	ENGLISH %	IRISH CASES	IRISH %	OTHER CASES	OTHER %
CONGENITAL AND UNDETERMINED CONDITIONS:									
Congenital	152	144	94·74	3	1·97	5	3·29	—	—
Abiotrophy	87	72	82·75	5	5·74	10	11·49	—	—
Tumours	3	3	—	—	—	—	—	—	—
Myopia	524	443	84·54	17	3·24	62	11·83	2	0·38
Other Refractions	1	—	—	—	—	1	—	—	—
Glaucoma	279	232	83·15	18	6·45	27	9·68	2	0·72
Cataract	522	421	80·65	12	2·30	87	16·67	2	0·38
Other Primary Defects	28	26	92·85	1	3·57	1	3·57	—	—
Total	1,596	1,341	84·55	56	3·53	193	12·17	6	0·38
INFECTIOUS AND TOXIC CONDITIONS:									
Exogenous—									
Ophthalmia Neonatorum	94	82	87·23	6	6·38	6	6·38	2	2·13
Trachoma	26	19	73·08	1	3·86	5	19·23	1	3·86
Local Infections	79	64	81·01	4	5·06	10	12·66	1	1·26
Other	3	3	—	—	—	—	—	—	—
Total	202	168	83·17	11	5·44	19	9·40	4	1·98
Endogenous—									
Gonorrhœa	2	1	—	1	—	—	—	—	—
Syphilis, Congenital	149	133	89·26	13	8·72	2	1·34	1	0·67
Syphilis, Acquired	192	161	83·85	8	4·16	21	10·94	2	1·04
Smallpox	6	5	—	—	—	1	—	—	—
Measles	28	23	82·14	2	7·14	2	7·14	1	3·57
Scarlet Fever	4	3	—	—	—	1	—	—	—
Others	1	1	—	—	—	—	—	—	—
Meningitis	35	32	91·43	2	5·71	1	2·86	—	—
Tubercle	20	18	90·00	1	5·00	1	5·00	—	—
Phlyctenular	83	73	87·95	3	3·61	6	7·23	1	1·20
Septicæmia, Acute	10	10	—	—	—	—	—	—	—
Septicæmia, Chronic	340	284	83·53	18	5·29	35	10·29	3	0·88
Other	29	27	93·10	—	—	2	6·90	—	—
Total	899	771	85·76	48	5·33	72	8·01	8	8·89
TRAUMATIC AND CHEMICAL CONDITIONS:									
Birth	3	3	—	—	—	—	—	—	—
Non-Industrial	28	20	71·43	2	7·14	6	21·43	—	—
Industrial	80	70	87·5	1	1·25	9	11·25	—	—
War	9	6	66·66	1	11·11	2	22·22	—	—
Not Ascertainable	15	13	86·66	—	—	2	13·33	—	—
Sympathetic Ophthalmia	69	60	86·95	3	4·34	6	8·69	—	—
Tobacco	4	3	—	—	—	1	—	—	—
Alcohol	1	1	—	—	—	—	—	—	—
Other	2	2	—	—	—	—	—	—	—
Total	211	178	84·36	7	3·32	26	12·32	—	—
SYSTEMIC DISEASES:									
Anæmia	1	1	—	—	—	—	—	—	—
Diabetes	40	36	90·00	—	—	3	7·50	1	2·50
Nephritis	5	5	—	—	—	—	—	—	—
Pregnancy	6	6	—	—	—	—	—	—	—
Vascular	97	75	77·31	2	2·06	20	20·61	—	—
Intracranial Neoplasm	36	34	94·44	—	—	2	5·55	—	—
C.N.S. Diseases	36	32	86·48	1	2·70	2	5·40	1	2·70
Other General Diseases	8	8	—	—	—	—	—	—	—
Total	229	197	83·47	3	1·27	27	11·44	2	0·84
NOT CLASSIFIED	21	17	—	1	—	—	—	—	—
TOTAL	3,158	2,672	84·61	126	3·99	340	10·76	20	0·63

Defects in Second Blind Eye, with Distribution according to Sex, Age of Onset and Age of Blindness, together with Result of Kahn Test

Defects in Second Blind Eye, with Distribution according to Sex, Age of Onset and Age of Blindness, together with Result of Kahn Test

DEFECTS	DISTRIBUTION		DISTRIBUTION OF MALES		MEAN AGE ONSET OF CAUSE		MEAN AGE ONSET OF BLINDNESS		RESULT OF KAHN TEST	
	CASES	%	%	S.E.±	AGE	S.D. ±	AGE	S.D.	CASES TAKEN	% POSITIVE
Congenital Anomalies	140	4·35	52·87	4·12	21	—	14·38	25·8	87	—
Albinism	7	0·22	57·14	—	21	—	22·4	—	6	—
Wounds of Eyeball	86	2·67	91·86	1·73	36·63	13·75	38·88	12·9	62	3·2
Conjunctiva, Inflam. Disease ...	55	1·71	43·64	6·69	7·92	17·23	21·38	25·7	32	3·1
Lids and Sac, Inflam. Disease ...	8	0·25	50·00	—	—	—	46·45	—	6	—
Sclera, Inflam. Disease	1	0·03	—	—	—	—	—	—	1	—
Ulcer Corneae	316	9·82	48·42	2·66	19·99	21·84	33·9	24·54	197	5·1
Interstitial Keratitis	95	2·95	36·84	4·95	15·57	11·18	25·25	16·19	79	50·6
Other Corneal Conditions ...	11	0·34	36·36	—	—	—	—	—	3	—
Irido Cyclitis	279	8·67	43·73	2·93	36·66	20·17	43·64	19·39	192	9·9
Endophthal, etc.	81	2·52	56·79	5·50	29·32	20·71	31·88	21·56	55	5·5
Retinitis Exudative	49	1·52	44·90	7·10	54·52	18·44	59·00	13·60	23	8·6
Retinitis Degenerative	132	4·10	66·67	4·10	34·71	10·29	44·17	17·63	99	13·1
Detachment of Retina	35	1·09	71·43	7·64	40·58	15·62	43·84	16·49	27	—
Choroiditis	109	3·39	57·80	4·73	34·94	22·80	45·27	19·39	65	33·8
Optic Neuritis or Atrophy ...	380	11·80	68·68	2·38	34·07	19·75	37·81	19·74	246	31·7
Retro Bulbar Neuritis	7	0·22	100·00	—	—	—	—	—	5	20·0
Indeterminate	9	0·28	—	—	—	—	—	—	7	28·6
Tumour, Extra-Ocular	3	0·09	—	—	—	—	—	—	—	—
Tumour, Intra-Ocular	2	0·06	—	—	—	—	—	—	—	—
Cataract	491	15·25	43·18	2·24	60·5	13·64	65·61	9·72	200	7·0
Aphakia	77	2·39	64·94	5·44					54	7·4
Other Lens Abnormalities ...	1	0·03	—	—	—	—	—	—	—	—
Myopia	525	16·31	50·86	2·18	16·16	17·29	52·40	13·35	373	7·8
Intra-Ocular Hæmorrhage ...	5	0·15	40·00	—	—	—	—	—	3	—
Glaucoma	280	8·69	56·07	2·97	58·96	9·38	61·93	14·66	164	7·9
Glaucoma, Secondary	3	0·09	—	—	—	—	—	—	1	—
Nystagmus	1	0·03	—	—	—	—	—	—	1	—
Cortical and Tract Lesions ...	22	0·68	81·82	8·22	—	—	—	—	9	—
Lid Paralysis	2	0·06	—	—	—	—	—	—	—	—
Amblyopia Ex anopsia	1	0·03	—	—	—	—	—	—	1	—
Others	6	0·19	—	—	—	—	—	—	3	—
	3,219	—	—	—	—	—	—	—	2,011	12·6

TABLE M

Defects in Second Blind Eye arranged according to Age Group of Onset and of Blindness

DEFECTS	CASES	AGE GROUP OF ONSET										AGE GROUP OF BLINDNESS									
		Not Stated	0–1	1–4	5–15	16–29	30–39	40–49	50–59	60–69	70+	Not Stated	0–1	1–4	5–15	16–29	30–39	40–49	50–59	60–69	70+
			0	2	3	4	5	6	7	8	9		0	2	3	4	5	6	7	8	9
Congenital Anomalies ...	140	—	136	2	2	—	—	—	—	—	—	—	79	10	12	7	5	9	12	4	2
Albinism	7	—	7	—	—	—	—	—	—	—	—	—	4	—	—	—	—	2	—	1	—
Wounds of Eyeball	86	—	—	2	3	26	21	19	6	8	1	—	—	—	2	22	23	19	8	11	1
Conjunctiva, Inflam. Disease	55	—	19	17	9	2	2	3	3	—	—	—	15	16	3	3	4	1	5	4	4
Lids and Sac, Inflam. Disease	8	—	—	1	3	—	1	—	2	1	—	—	—	—	—	—	—	2	—	4	2
Sclera, Inflam. Disease ...	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—
Ulcer Corneae	316	—	49	62	96	20	19	22	22	18	8	—	35	37	37	29	30	39	52	41	16
Interstitial Keratitis	95	—	3	9	52	20	6	4	1	—	—	—	1	4	32	25	12	12	7	2	—
Other Corneal Conditions ...	11	—	—	—	4	—	1	2	3	1	—	—	—	—	—	—	—	2	4	4	1
Irido-cyclitis	279	4	4	9	43	51	48	39	37	34	10	3	3	5	21	39	46	46	51	45	20
Endophthalmitis, etc. ...	81	—	3	6	21	15	8	14	5	7	2	—	2	7	18	14	7	14	9	7	3
Retinitis, Exudative ...	49	1	—	—	2	2	4	4	16	15	5	—	—	1	—	2	4	4	11	18	10
Retinitis, Degenerative ...	132	1	6	7	29	30	14	18	16	8	3	1	2	2	6	19	15	32	32	17	6
Detachment of Retina ...	35	—	—	—	1	10	5	9	6	3	1	—	—	—	1	8	4	9	7	4	2
Choroiditis	109	—	4	4	28	12	11	17	14	12	7	—	1	1	10	9	22	18	18	20	10
Optic Neuritis or Atrophy ...	380	2	16	19	58	55	69	74	52	29	6	1	12	16	49	43	61	80	72	37	9
Retro-bulbar Neuritis ...	7	—	—	—	1	1	—	—	—	5	—	—	—	—	1	1	—	—	—	5	—
Indeterminate	9	1	—	2	3	2	—	1	—	—	—	1	—	2	2	1	—	2	1	—	—
Tumour, Extra-ocular ...	3	—	—	—	—	—	1	—	1	—	1	—	—	—	—	—	—	—	2	—	1
Tumour, Intra-ocular ...	2	—	—	2	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—
Cataract	491	2	2	—	5	7	20	34	114	179	128	1	—	1	—	1	5	22	70	202	189
Aphakia	77	—	—	—	2	5	4	12	23	23	8	1	—	—	—	1	2	9	15	32	17
Other Lens Abnormalities ...	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—
Myopia	525	7	63	38	307	25	18	16	29	16	6	9	—	—	8	35	44	87	171	144	27
Intra-ocular Hæmorrhage ...	5	—	—	—	1	1	1	1	—	1	—	—	—	—	1	1	1	1	—	1	—
Glaucoma	280	1	—	—	1	5	10	41	77	98	47	1	—	—	—	2	10	22	66	116	63
Glaucoma, Secondary ...	3	—	—	—	—	—	—	1	—	2	—	—	—	—	—	—	—	1	—	2	—
Nystagmus	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
Cortical and Tract Lesions ...	22	—	3	—	1	1	1	—	6	7	3	—	2	1	1	1	—	—	5	8	4
Lid Paralysis	2	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	1	1	—	—
Amblyopia Ex anopsia ...	1	—	—	—	1	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
Others	6	—	—	—	—	—	—	1	1	3	1	—	—	—	—	—	—	—	2	3	1
	3,219	19	316	180	674	291	264	333	435	470	237	18	156	104	205	264	296	435	621	732	388

TABLE N

Causes of Blindness with Defects found at Examination

Others	6	—	—	—	—	—	—	—	1	1	3	1	—	—	—	—	1	—	—	—	—	2	3	1	
	3,219	19	316	180	674	291	264	333	435	470	237	18	156	104	205	264	296	435	621	732	388				

TABLE X

Causes of Blindness with Defects found at Examination

CAUSES OF BLINDNESS	CONGENITAL ANOMALIES	ALBINISM	WOUNDS OF EYEBALL	INFLAMMATORY DISEASES OF CONJUNCTIVA	INFLAMMATORY DISEASES OF LIDS AND LACHRYMAL SAC	INFLAMMATORY DISEASE OF SCLERA	INFLAMMATORY DISEASE OF CORNEA—ULCERATIVE	INFLAMMATORY DISEASE OF CORNEA—INTERSTITIAL	OTHER CORNEAL DISEASE	IRIDO CYCLITIS	ENDOPHTHALMITIS	RETINITIS—EXUDATIVE	RETINITIS—DEGENERATIVE	DETACHMENT OF RETINA	CHOROIDITIS (NOT MYOPIC)	OPTIC NEURITIS OR ATROPHY	RETROBULBAR NEURITIS	INDETERMINATE	TUMOUR—EXTRA-OCULAR	TUMOUR—INTRA-OCULAR	CATARACT	APHAKIA	OTHER LENS ABNORMALITIES	MYOPIA	INTRA-OCULAR HÆMORRHAGE	GLAUCOMA—PRIMARY	GLAUCOMA—SECONDARY	NYSTAGMUS	CORTICAL AND TRACT LESIONS	LID PARALYSIS	AMBLYOPIA EX ANOPSIA	OTHERS	TOTAL
A. CONGENITAL AND UNDETERMINED CONDITIONS:																															
Congenital Anomalies ...	140	7	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	153
Abiotrophies	—	—	—	—	—	—	—	—	2	—	—	—	66	—	1	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	87
Tumour of Globe and Orbit	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	—	—	—	—	—	—	—	—	—	—	—	4
Myopia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	525	—	—	—	—	—	—	—	526
Other Errors of Refraction	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Glaucoma, Primary ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	280	—	—	—	—	—	280
Cataract, Primary ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	466	74	—	—	—	—	—	—	—	—	—	540
Other Primary Defects ...	—	—	—	—	—	—	—	—	—	—	—	—	—	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	28
	140	7	—	—	—	—	—	—	2	—	—	—	66	28	1	23	—	—	2	2	466	75	—	525	—	280	—	1	—	—	1	—	1,619
B. INFECTIOUS AND TOXIC CONDITIONS:																																
Exogenous—																																
Ophthalmia Neonatorum	—	—	—	37	—	—	62	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	99
Trachoma	—	—	—	14	2	—	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26
Local Septic Infection	—	—	—	2	4	—	75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	81
Other Septic Infection	—	—	—	1	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
	—	—	—	54	6	—	149	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	209
Endogenous—																																
Gonorrhœa	—	—	—	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
Syphilis, Congenital ...	—	—	—	—	—	—	—	81	—	23	—	—	8	—	26	13	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	152
Syphilis, Acquired ...	—	—	—	—	—	—	—	5	—	22	—	—	10	—	28	131	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	196
Smallpox	—	—	—	—	—	—	5	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6
Measles	—	—	—	—	2	—	21	—	—	2	2	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	28
Scarlet Fevers	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	4
Other Fevers	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Meningitis	—	—	—	—	—	—	—	—	—	2	3	—	—	—	—	32	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	39
Tuberculosis	—	—	—	—	—	1	9	2	—	5	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20
Phlyctenular	—	—	—	—	—	—	83	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	84

TABLE N—*continued*

CAUSES OF BLINDNESS	CONGENITAL ANOMALIES	ALBINISM	WOUNDS OF EYEBALL	INFLAMMATORY DISEASES OF CONJUNCTIVA	INFLAMMATORY DISEASES OF LIDS AND LACRYMAL SAC	INFLAMMATORY DISEASE OF SCLERA	INFLAMMATORY DISEASE OF CORNEA—ULCERATIVE	INFLAMMATORY DISEASE OF CORNEA—INTERSTITIAL	OTHER CORNEAL DISEASE	IRIDO CYCLITIS	ENDOPHTHALMITIS	RETINITIS—EXUDATIVE	RETINITIS—DEGENERATIVE	DETACHMENT OF RETINA	CHOROIDITIS (NOT MYOPIC)	OPTIC NEURITIS OR ATROPHY	RETROBULBAR NEURITIS	INDETERMINATE	TUMOUR—EXTRA-OCULAR	TUMOUR—INTRA-OCULAR	CATARACT	APHAKIA	OTHER LENS ABNORMALITIES	MYOPIA	INTRA-OCULAR HÆMORRHAGE	GLAUCOMA—PRIMARY	GLAUCOMA—SECONDARY	NYSTAGMUS	CORTICAL AND TRACT LESIONS	LID PARALYSIS	AMBLYOPIA EX ANOPSIA	OTHERS	TOTAL
Endogenous—continued																																		
Septicæmia, Acute ...	–	–	–	–	–	–	3	–	–	2	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10
Septicæmia, Chronic ...	–	–	–	–	–	–	18	6	6	211	1	5	19	1	46	30	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	345
Other General Infect.	–	–	–	–	–	–	2	1	2	–	–	2	3	–	2	15	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	2	31
	–	–	–	1	2	1	142	95	9	268	14	7	40	1	103	225	–	3	–	–	1	–	–	–	2	–	–	–	1	1	–	2	918
C. TRAUMATIC AND CHEMICAL CONDITIONS :																																		
Birth Trauma	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	1	3
Non-Industrial Trauma ...	–	–	14	–	–	–	6	–	–	–	–	–	–	1	–	5	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	28
Industrial Trauma ...	–	–	56	–	–	–	13	–	–	–	–	–	–	4	–	7	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	81
War Trauma	–	–	7	–	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9
Trauma, not Ascertainable	–	–	9	–	–	–	3	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	15
Sympathetic Ophthalmia	–	–	–	–	–	–	–	–	–	6	65	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	75
Chemico-Toxic	–	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3
	–	–	86	–	–	–	22	–	–	8	65	–	1	5	–	16	5	1	–	–	–	–	1	–	–	–	–	–	3	–	–	1	214
D. SYSTEMIC DISEASE :																																		
Anæmia and Blood Diseases	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Diabetes	–	–	–	–	–	–	–	–	–	–	–	14	–	–	–	2	–	–	–	–	24	2	–	–	–	–	–	–	1	–	–	–	43
Nephritis	–	–	–	–	–	–	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	5
Pregnancy	–	–	–	–	–	–	–	–	–	1	2	1	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6
Vascular Diseases ...	–	–	–	–	–	–	–	–	–	–	–	22	24	–	5	28	1	–	–	–	–	–	–	–	2	–	3	–	13	–	–	2	100
Intracranial Neoplasm ...	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	34	–	–	1	–	–	–	–	–	–	–	–	–	1	–	–	–	36
Other Diseases of Central Nervous System ...	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	33	1	–	–	–	–	–	–	–	–	–	–	–	2	1	–	–	37
Other General Diseases ...	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	4	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	8
	–	–	–	–	–	–	3	–	–	1	2	41	24	–	5	104	2	–	1	–	24	2	–	–	3	–	3	–	18	1	–	2	236
E. NOT CLASSIFIED	–	–	–	–	–	–	–	–	–	2	–	1	1	1	–	12	–	5	–	–	–	–	–	–	–	–	–	–	–	–	–	1	23
ALL CASES	140	7	86	55	8	1	316	95	11	279	81	49	132	35	109	380	7	9	3	2	491	77	1	525	5	389	3	1	77	3	1	6	1,819

TABLE O

E. NOT CLASSIFIED	-	-	-	-	-	-	-	-	-	2	-	1	1	1	-	12	-	5	-	-	-	-	-	-	-	-	-	-	-	1	23
ALL CASES	140	7	86	55	8	1	316	95	11	279	81	49	132	35	109	380	7	9	3	2	491	77	1	335	3	389	2	1	38	2	1	6	1,219

TABLE O

Cases arranged according to Decades of Onset of Cause of Blindness and Decades of Onset of Blindness

CAUSES OF BLINDNESS	CASES	DECADES OF ONSET OF CAUSE OF BLINDNESS											DECADES OF ONSET OF BLINDNESS										
		Not Stated	1840-49	1850-59	1860-69	1870-79	1880-89	1890-99	1900-09	1910-19	1920-29	1930+	Not Stated	1840-49	1850-59	1860-69	1870-79	1880-89	1890-99	1900-09	1910-19	1920-29	1930+
CONGENITAL AND UNDETERMINED—																							
Congenital Anomalies	153	—	—	1	6	22	26	12	20	36	23	7	—	—	—	2	6	12	9	14	39	42	29
Abiotrophies	87	1	—	—	—	3	8	17	22	22	13	1	—	—	—	—	—	—	—	4	13	44	26
Tumour of Globe and Orbit ...	4	—	—	—	—	—	—	—	1	1	2	—	—	—	—	—	—	—	—	—	—	4	—
Myopia	526	7	1	9	82	128	124	45	27	35	57	11	9	—	—	—	—	1	9	18	52	250	187
Glaucoma	280	1	—	—	—	—	1	5	8	39	158	68	1	—	—	—	—	—	2	3	19	119	136
Cataract	540	2	—	—	2	5	5	8	27	99	292	100	2	—	—	—	—	—	—	8	28	230	272
Primary Detachment	28	—	—	—	—	—	1	1	4	3	11	8	—	—	—	—	—	—	1	2	4	11	10
Others	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
Total	1,619	11	1	10	90	159	165	88	109	235	556	195	12	—	—	2	7	13	21	49	155	700	660
INFECTIOUS AND TOXIC—																							
Exogenous—																							
Ophthalmia Neonatorum ...	99	—	—	—	4	17	21	16	14	18	7	2	—	—	—	3	10	18	13	14	20	16	5
Trachoma	26	—	—	1	1	1	5	4	3	7	4	—	—	—	—	—	—	—	—	—	4	13	9
Local Septic Infection	81	—	—	2	1	7	8	8	7	15	25	8	—	—	—	—	4	5	3	1	11	32	25
Others	3	—	—	—	—	—	1	—	1	1	—	—	—	—	—	—	—	—	1	—	1	1	—
Total	209	—	—	3	6	25	35	28	25	41	36	10	—	—	—	3	14	23	17	15	36	62	39
Endogenous—																							
Gonorrhœa	2	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	1	—	1	—	—	—
Syphilis, Congenital	152	—	—	2	—	3	22	21	26	35	36	7	1	—	1	—	—	7	8	9	34	61	31
Syphilis, Acquired	196	1	—	—	—	2	1	2	19	40	89	42	2	—	—	—	—	—	—	5	27	92	70
Smallpox	6	—	—	—	2	—	2	—	1	—	1	—	—	—	—	—	—	—	—	1	1	3	1
Measles	28	—	—	—	1	6	4	4	5	4	3	1	—	—	—	—	2	4	4	4	4	7	3
Scarlet Fever	4	—	—	—	—	1	1	—	1	—	1	—	—	—	—	—	—	1	—	1	—	1	1
Other Fevers	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—
Meningitis	39	1	—	—	1	3	4	3	3	10	11	3	—	—	—	1	2	4	2	3	10	14	3
Tuberculosis	20	—	—	—	—	1	2	1	6	5	5	—	—	—	—	—	—	—	1	3	1	10	5
Phlyctenular	84	—	—	—	7	17	23	14	10	6	5	2	—	—	—	—	5	4	4	8	18	28	17

TABLE O—*continued*

CAUSES OF BLINDNESS	CASES	DECADES OF ONSET OF CAUSE OF BLINDNESS											DECADES OF ONSET OF BLINDNESS										
		Not Stated	1840–49	1850–59	1860–69	1870–79	1880–89	1890–99	1900–09	1910–19	1920–29	1930+	Not Stated	1840–49	1850–59	1860–69	1870–79	1880–89	1890–99	1900–09	1910–19	1920–29	1930+
Septicæmia, Acute	10	—	—	—	1	1	—	—	2	5	—	1	—	—	—	1	1	—	—	2	5	—	1
Septicæmia, Chronic	345	3	—	1	1	5	26	32	48	70	133	26	1	—	—	—	—	11	16	26	53	143	95
Other Infections	31	—	—	—	—	—	4	2	3	7	11	4	—	—	—	—	—	2	1	2	5	12	9
Total	918	5	—	3	13	39	90	80	125	182	295	86	4	—	1	2	10	34	37	65	158	371	236
TRAUMATIC AND CHEMICAL—																							
Injury—																							
Birth Injury	3	—	—	—	—	—	—	—	—	1	—	2	—	—	—	—	—	—	—	—	1	—	2
Non-Industrial	28	—	—	—	—	—	4	2	6	6	5	5	—	—	—	—	—	2	2	5	6	6	7
Industrial	81	—	—	—	—	2	1	6	12	26	25	9	—	—	—	—	2	1	4	7	23	33	11
War	9	—	—	—	—	—	—	—	1	8	—	—	—	—	—	—	—	—	—	1	7	1	—
Not Ascertained...	15	—	—	—	—	—	2	3	2	5	3	—	—	—	—	—	—	—	1	4	5	5	—
Sympathetic Ophthalmia ...	71	—	—	—	—	3	8	9	17	10	17	7	—	—	—	—	2	6	8	16	7	22	10
All Injuries	207	—	—	—	—	5	15	20	38	56	50	23	—	—	—	—	4	9	15	33	49	67	30
Chemico-toxic	7	1	—	—	—	—	—	—	1	1	4	—	1	—	—	—	—	—	—	—	—	3	3
SYSTEMIC DISEASE—																							
Diabetes	43	—	—	—	—	—	—	—	—	2	23	18	—	—	—	—	—	—	—	—	1	14	28
Vascular Disease	100	1	—	—	—	—	—	—	1	13	50	35	1	—	—	—	—	—	—	—	4	31	64
Intracranial Neoplasm	36	—	—	—	—	—	—	—	—	1	19	16	—	—	—	—	—	—	—	—	—	16	20
Disease of Central Nervous System	37	—	—	—	—	1	1	3	4	9	10	9	—	—	—	—	1	1	3	3	8	11	10
Other General Diseases	20	—	—	—	—	—	1	2	2	5	2	8	—	—	—	—	—	—	2	1	3	4	10
Total	236	1	—	—	—	1	2	5	7	30	104	96	1	—	—	—	1	1	5	4	16	76	132
Not Classified	23	1	—	—	—	1	2	3	1	6	5	4	1	—	—	—	—	2	—	1	8	6	5
GRAND TOTAL	3,219	19	1	16	109	230	309	224	306	551	1,050	404	19	—	1	7	36	82	95	167	422	1,285	1,105

FOUR UNUSUAL CASES OF CONJUNCTIVITIS

BY

MAJOR E. F. KING

R.A.M.C.

THESE four cases were of chronic conjunctivitis occurring in soldiers.

Though differing in detail they show certain features in common, which, I think, group them as a clinical entity, the pathogenesis of which, however, remains unsolved. I do not recall having seen similar cases in civilian practice or to have read a description of the condition in the literature.

The following are the clinical features common to each of the cases:

On preliminary examination slight ptosis was seen, together with a boggy fullness of the skin of both upper and lower lids. The eye tended to water and to be photophobic, but, in general, discharge was scanty, except during periods of secondary infection. The injection of the conjunctiva was largely confined to the posterior surface of the lids and the fornices, particularly the lower, and to the region of the plica and caruncle. This distribution of the hyperaemia was striking, and contrasted markedly with the relative whiteness of the ocular conjunctiva. The whole conjunctiva was somewhat oedematous and there was a diffuse milkiness, particularly in the lower fornix, reminiscent of spring catarrh, and presumably the result of epithelial hyperplasia.

In the upper fornix were a few scattered follicles. The two more severe cases developed subconjunctival fibrosis in the lower fornix, leading subsequently, in the case of one man, to marked contraction.

In two cases the cornea remained unaffected, in the other two a diffuse superficial keratitis was seen, extending over the greater part of the cornea; superficial vascularisation occurred and the whole picture was very similar to a diffuse phlyctenular keratitis of children.

A striking feature is that each case remained entirely unilateral, there being no suggestion of involvement of the conjunctiva or cornea in the second eye. The condition was markedly persistent and chronic in its course. At the latter part of last year one case had persisted for eight, another for seven and two for four months. During these times the men had been completely incapacitated from their duties and had spent the greater part of the time in hospital. There was seen during this period intermittent infection with secondary pyogenic organisms, accompanied by exacerbation of the keratitis and enlargement of the pre-auricular gland.

The two severe cases, in which subconjunctival fibrosis occurred, were invalided out of the Army, the two others ultimately returned to duty, although the condition was still present and further relapses seemed probable.

The following are brief notes on each case:—

(*a*) PRIVATE H. (aged 27 years), Fig. 1.—Attended first giving the history of a burn to the left eye from a hot cinder. Examination showed some conjunctivitis and a small necrotic patch in the lower palpebral conjunctiva of the left eye. The condition

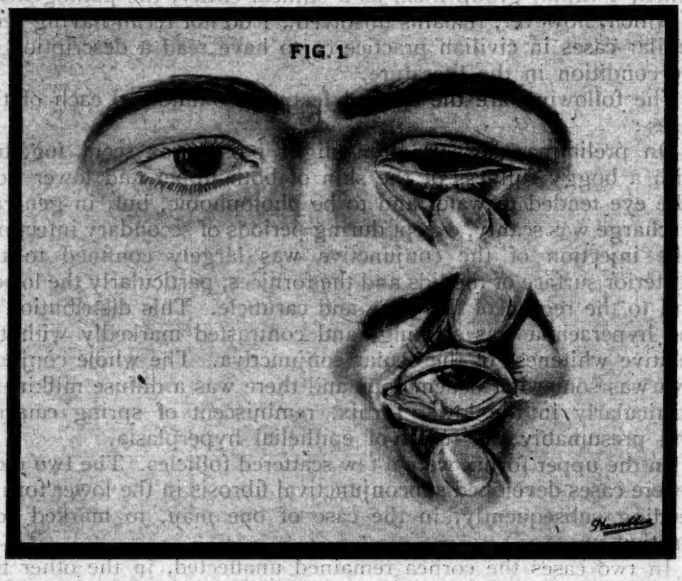

FIG. 1

was slight and superficial and he was given out-patient treatment. Two weeks later he had developed oedema of the lids, particularly the lower, and conjunctival injection largely confined to the fornices. The ulcerated area in the lower fornix was still present and beneath it and the adjacent conjunctiva fibrosis was commencing. The pre-auricular gland on the same side was enlarged and tender. From this time he received continuous out and in-patient treatment until his discharge from the Army eight months later. During this period new foci of necrosis appeared in the lower fornix, and as each healed further subconjunctival scarring resulted. Finally, the condition appeared relatively quiescent, though there was still marked oedema of the lids and conjunctival injection. The diffuse fibrosis in the lower fornix appeared to be continuous with a

generalised thickening of the lower tarsal plate. During the active period, secondary infection of the conjunctiva occurred from time to time, leading to muco-purulent discharge and superficial keratitis with small areas of corneal ulceration; these attacks subsided in the course of a few days.

General examination of the man revealed no abnormality. All blood investigations were normal. Conjunctival culture revealed staphylococcus aureus only. Inoculation of guinea-pigs with a piece of excised conjunctiva failed to reveal any evidence of tuberculosis.

Biopsy of the affected conjunctiva showed "marked increase of collagen fibres, extensive round-celled infiltration with plasma cells, lymphocytes and a few polymorphonuclear cells. Pronounced periarteritis and endarteritis of small vessels. A combination of hyperplasia and degenerative changes in the surface epithelium. No evidence of tuberculosis. The appearance being that of a sub-acute, non-specific inflammatory reaction."

A large number of therapeutic agents were tried, none of which appeared to assist in any way. The attacks of secondary infection were helped by sulphonamides, which were used both locally and generally.

(*b*) PRIVATE F. (aged 29 years), Fig. 2.—The onset in this man was acute. There was considerable injection and chemosis, largely

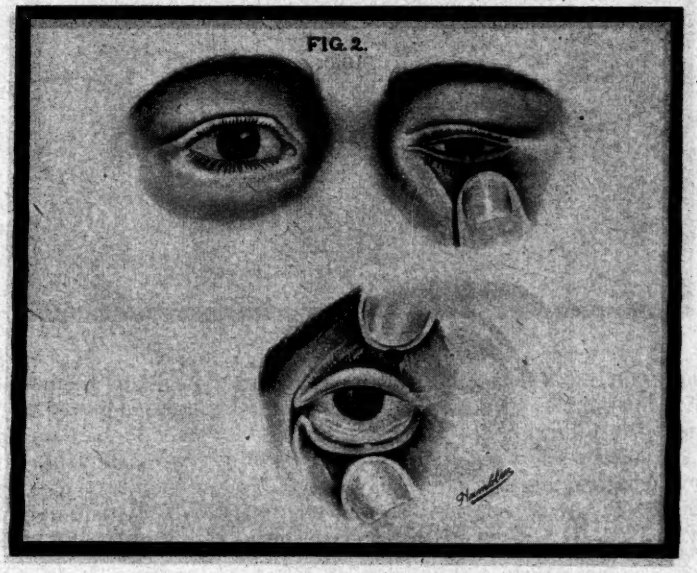
FIG. 2.

confined to the lower fornix. Both lids, but particularly the lower, were oedematous. There was enlargement of the pre-auricular gland on the affected side. When the acute phase had passed, the oedema of the lids and conjunctival injection persisted. The surface of the conjunctiva in the lower fornix developed a milky sheen, due to epithelial hyperplasia and beneath this some degree of subconjunctival fibrosis ensued, though there were no areas of conjunctival necrosis, such as were seen in the previous patient. A diffuse superficial keratitis slowly developed, leading at times to ulceration and ultimately to considerable vascularisation and scarring. After the acute onset the condition pursued a chronic indolent course, and after seven months he was invalided out of the Army.

As in the previous case, exhaustive tests, both local and general, offered little help. Staphylococci only were grown from the conjunctival sac. Pathological examination of a piece of excised conjunctiva showed " a non-specific, sub-acute and chronic inflammatory process." All forms of treatment appeared to have little influence on the condition.

(*c*) GUNNER H. (aged 29 years), Fig. 3.—The condition of this man was very similar to the last patient. The onset was less acute, though the oedema of the lids and conjunctival injection were marked, particularly in the lower fornix and on the plica. Hyperplasia on the conjunctival epithelium was seen, though there was

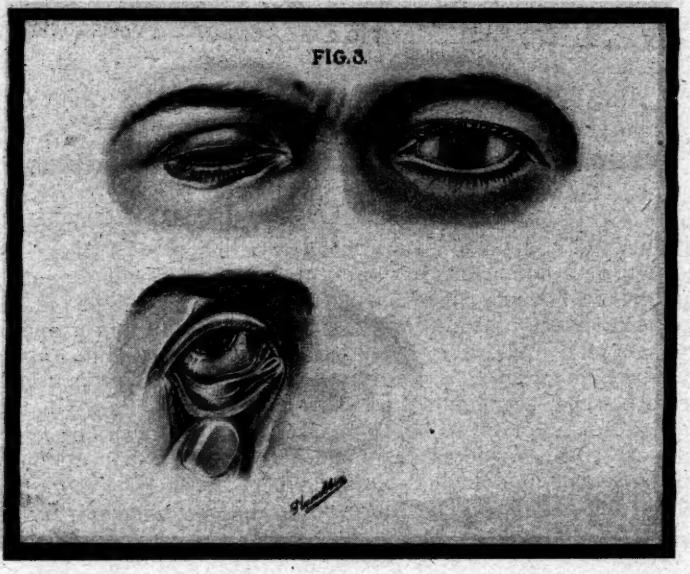

FIG. 3.

no subconjunctival fibrosis. The cornea remained unaffected throughout. After four months in hospital the condition had improved considerably, though recovery was not complete. He was able to return to duty.

As in the previous cases, investigations proved singularly unhelpful. Staphylococci only were grown from the conjunctiva. Biopsy of the conjunctiva revealed sub-acute, non-specific inflammation. All the usual lines of treatment were tried with little apparent benefit.

(*d*) SIGNALMAN P. (aged 25 years), Fig. 4.—In this man the injection was at first so localised to the lower fornix that a provisional diagnosis of episcleritis was made. The oedema of the lower lid, conjunctival injection, and epithelial hyperplasia were very similar to the previous cases, though less severe. The cornea

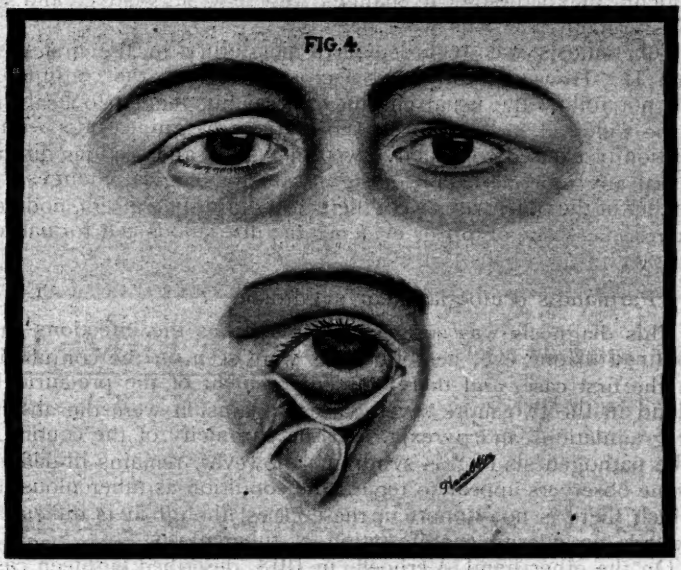

FIG. 4.

remained unaffected and subconjunctival fibrosis did not occur. After four months he was able to return to duty, though the condition had not entirely cleared up. Staphylococci were the only organisms in the conjunctival sac. Pathological examination of excised conjunctiva revealed, again, non-specific, sub-acute inflammation. All other investigations were negative. Treatment was along the usual lines.

Differential Diagnosis

The following possibilities were considered:—

1. An allergic conjunctivitis.

A milky sheen on the conjunctiva, such as occurs in spring catarrh, was seen to a variable extent in all the cases, particularly in the lower fornix. Furthermore, the conjunctiva was in each case oedematous, shiny and dry; an appearance very similar to early atropine irritation. Neither of the men, however, gave a history of any general allergic sensitivity, nor was there any significant eosinophilia locally or in the blood.

2. A specific inflammation.

Syphilis was excluded with confidence. Neither patient gave a history of infection, no significant general clinical signs were evident, the pathological changes were not suggestive, and the Wassermann reactions were negative.

Tuberculosis was regarded as a possibility in the first case, Pte. H. However, the small necrotic ulcers on the conjunctiva did not follow the usual chronic course, but tended to heal and to be followed by new foci. Inoculations of guinea-pigs with a portion of excised conjunctiva were negative, and sections did not reveal any tubercle bacilli or significant histological changes. In neither of the other cases were there any suggestive ulcers, nodules, excrescences or polypi, or evidence of tuberculous cell formations or bacilli.

3. Parinaud's oculo-glandular syndrome.

This diagnosis was suggested clinically as the infections were confined to one eye, necrotic areas were seen on the conjunctiva in the first case, and there was enlargement of the pre-auricular gland in the two more severe cases; against it were the absence of granulations and pyrexia, and the chronicity of the condition. The pathogenesis of this syndrome, however, remains ill-defined. Some observers appear to regard the condition as tuberculous, for which there is no support in these cases, though it is difficult to exclude an allergic manifestation of tuberculosis.

On the other hand, Verhoeff, in 1918, described eighteen cases of Parinaud's conjunctivitis, which he regarded as a mycotic infection due to a filamentous organism previously undescribed. The essential pathological features of his cases were multiple necrotic focal areas beneath the epithelium, section of which showed masses of endothelial phagocytes, packed with chromatin granules and surrounded by chronic inflammatory cells. By special staining, the leptothrices were demonstrable in and around these focal lesions. The condition followed a relatively acute

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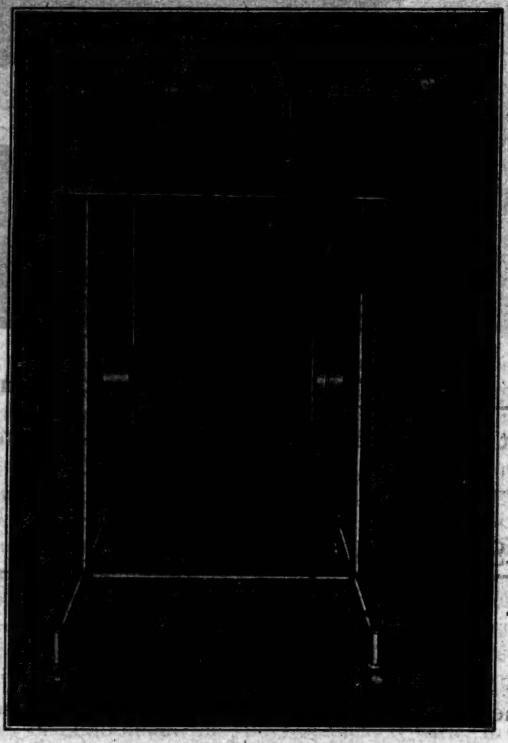

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course and recovery occurred in a few weeks. Though the special staining technique for the organisms was not adopted, I do not think that even the first of these cases (Pte. H.), in whom focal and necrotic lesions were seen in the conjunctiva, can be regarded as Verhoeff's leptothricosis conjunctivae for the course was essentially prolonged, marked subconjunctival scarring resulted, and sections of the conjunctiva failed to reveal any of the focal lesions he described.

4. Nutritional disturbances.

Some of the changes seen in the conjunctivae and corneae resembled those which have been described by Sydenstriker, Kruge and others as characteristic of vitamin A and riboflavin deficiences. They were, however, not typical and until the whole question of the ocular manifestations of nutritional disorders is clarified this suggestion must remain tentative.

Conclusions

This problem is one of monocular conjunctivitis, which persisted for many months. Biopsy of the conjunctiva showed marked changes, attributable to a non-specific, sub-acute inflammatory process.

In one case (Pte. H.), which was the most severe, small foci of necrosis in the lower fornix were seen, and subsequently marked contraction of the conjunctiva. In another (Pte. F.), there was no focal necrosis, but a mild subconjunctival fibrosis was apparent clinically. In the two other men (Gnr. H. and Sigmn. P.), the condition was less severe, no necrosis or scar contraction was apparent, and complete recovery was probable. It seems, however, that the differences were of degree rather than kind, for, as suggested above, many points of clinical similarity were observed and the pathological report on the conjunctiva of each man was substantially the same.

The pathogenesis of the condition remains obscure and it would be of interest to learn if other surgeons have had the care of such cases.

ANNOTATION

PURKYNĚ—A Pioneer in Ophthalmoscopy

William Thau, of Boston, contributes a paper under the above heading to the *Arch. of Ophthal.*, February, 1942. He comments in the first instance on the importance and amount of scientific knowledge hidden in the older literature, which is not

generally realised;* and states that from the available evidence it "clearly appears that the interior and the background of the eye of both animals and man were first observed by John Evangelist Purkyne." This eminent physiologist, generally spoken of as Purkinje in this country, was born in Bohemia at the end of the year 1787. He died at Prague in July, 1869, and was professor of physiology at Breslau for 27 years. Thau is hoping to bring out a book shortly on Purkinje. In getting together material, he was much struck by a tribute, paid by Heidenhain, in an address to celebrate the centenary of Purkinje's birth. He knew that his subject's investigations on the eye were made between 1818 and 1825. Two rare publications were searched in vain, but Thau was fortunate in obtaining photostats of Purkinje's Latin thesis of 1823. This is entitled "Commentatio de examine physiologico organi visus et systematis cutanei," and is an excessively rare tract. Two or three copies are said to exist in Europe and one in America. Here Thau found what he wanted. He gives the relative passages in the original Latin with a translation. We copy the translation with acknowledgements to author and editor of the *Archives*.

"The clearness or turbidity of the vitreous body is recognized from without on lateral illumination and inspection by determining whether the colour of the pupil is normal or cloudy according to the previously mentioned methods applying to the aqueous humour and lens.

But I also had a chance to see the interior of the eye where the vitreous body is located when, wearing myopic lenses, with candle light coming from far back, I examined the eye of a dog in order to learn about the nature of the shine which often marvellously emanates from the eyes of dogs and cats. Lo! whenever I observed the eye of the little dog from a certain direction, that light seemed to be thrown back, until I discovered that the light is reflected from the hollow surface of the lens into the eye and then returned. When the experiment was immediately repeated with human beings the same phenomenon occurred; indeed, the whole pupil lit up in a beautiful orange colour. Being still uncertain about the location of the reflected light, I constructed an artificial eye, which I filled with water, either clear or turbid to some degree, and the light shining through revealed both the background and the nature of the fluid.

Thus from now on practically no membrane or liquid content of the eye will escape the properly reflected light or the scrutinizing eye, and if practitioners spurning the painstaking inquiry of physiologists, will not disdain or fear this (method), they will find it useful in ocular diagnosis."

* Coats, in his Life of Chevalier Taylor, said that his views on squint had an astonishingly modern sound.

Save for an allusion in the obituary published by the Royal Society, Purkinje's observations seem to have been completely forgotten. The rest of Thau's paper deals with the early history of the ophthalmoscope. He gives some interesting letters from Helmholtz written to his father, and refers to William Cumming's observations in the late forties of last century, but omits any mention of Babbage's ophthalmoscope, which antedated that of Helmholtz by three years. The paper is illustrated by pictures of Purkinje, Helmholtz, Czermak and among other subjects figured is a convenient diagram illustrating the ophthalmoscopic methods of Purkinje, Helmholtz, and Ruete. We shall look forward to the publication of Dr. Thau's book and offer our congratulations on this first instalment.

ABSTRACTS

MISCELLANEOUS

(1) **Mann, Ida and Pullinger, B. D. (London).—A study of mustard gas lesions of the eyes of rabbits and men.** *Proc. Roy. Soc. Med. Sect. of Ophthal.*, January, 1942.

(1) **Mann** and **Pullinger** contributed this very important paper to the meeting of the section of ophthalmology, Royal Society of Medicine, on September 26, 1941. Rabbits are suitable for experiments since "they reproduce lesions almost identical with those seen in man, though they require a larger dose to do so. The pathological processes are speeded up in proportion to their shorter expectation of life, and since the life of a rabbit is roughly one-tenth that of a man, a result which would take ten years to develop in a man may be obtained in a rabbit within a year." It is not an easy paper of which to give an abstract and those who were not present at the meeting would do well to read this paper in full.

The course of mustard gas lesions of the rabbit cornea compiled from observations on 138 eyes is set out in tabular form and a similar table has been constructed to show the course in man, compiled from observations on 65 cases.

It will best serve the purpose of this note if we abstract the latter table relating to human observations. After exposure to mustard gas there is no immediate sensation but exposure is later followed by a burning sensation and hyperaemia and lacrymation come on in 2-6 hours. Thereafter, the table divides cases into three groups (1) very mild cases; (2) mild cases; (3) severe cases. In the first of these the lids are not closed, the conjunctiva is hyperaemic, the cornea is normal in 24 hours and the condition clears up within a week. In the second group of mild cases there is injury to the

epithelium, punctate staining, hyperaemia and oedema of lids and epithelium. The eyes are partially closed 3-4 days. The condition clears up in 4 days to 6 weeks and the case is left with a healed corneal lesion which will not relapse.

In the third group of severe cases there is hyperaemia of the conjunctiva, oedema of epithelium and substantia propria with damage to the limbal blood supply; also oedema of lids and the eyes are closed after 8 hours. From now onwards the table is arranged in two columns (1) severe cases; (2) very severe cases. In the less severe cases the eyes open at 5 days, there is thence onward subsidence of primary oedema and beginning sub-conjunctional haemorrhages; this stage lasts 3-5 weeks and is followed by vascularization and secondary oedema for another 8 weeks or more. The state finally subsides and will probably not relapse.

In very severe cases the eyes are closed for 7 weeks, there is persistance of oedema, increased and repeated vascularization which may last 2 months to a year and may then end in one of three ways: the first, subsidence with vascular scar. Such an eye is unsafe and the condition may break down from one to six years. In the second class, cholesterin and fatty degeneration make their appearance and recurrent ulceration may go on for 6 to 20 years. The last class consists of perforation and phthisis bulbi.

There is a coloured plate and six other plates which have been well chosen and admirably reproduced.

R. R. J.

(2) **Livingston, Group-Captain P. C., R.A.F.—The examination of night visual capacity in relation to flying.** *Brit. Jl. Surgery*, January, 1942.

(2) **Livingston** reviews recent work on dark adaptation and refers to the extreme complexity of the subject. He says that for the examination of Air Force personnel it is clear that "a binocular test should provide the basis for examination . . . . so different can be the characteristics of two eyes, it is not possible without examining very great numbers to produce evidence to substantiate the claim made for monocular tests."

In describing a technique developed for the R.A.F. he states that the requirements appeared to be best met by creating an apparatus which:—

"*a.* Provided for a condition of preliminary preparation that caused no abnormal sensations, and acted as a passive introduction to the test itself.

b. Examined 6 personnel at a time, and could deal with 72 in the course of the day, by testing seven groups in the morning and five in the afternoon.

c. Produced a number of stimuli for solution, thus providing a wide scatter for the assessment of results."

"When a subject is dark adapting two phases can be differentiated. The first is associated with the reactions taking place in central, photopic, or cone vision; a curve can be plotted which occupies approximately the first ten minutes. After this, central vision, having attained its highest value, resigns its effectiveness in favour of a curve of different character. This, the curve of paracentral, scotopic, or rod vision, goes on to attain its perfection in approximately 60 minutes from the commencement of the test."

The instrument adapted to the requirements of the R.A.F. is a rotating hexagon 24 in. high, with four rectangular apertures in each face. The apertures associated with the standard test are those in the middle and bottom sections. In the middle section are two identical apertures separated by one inch, while the bottom aperture is single. Behind each panel is a white flashed opal screen, visible only in the apertures. The screens can be moved up or down by means of knobs, so that objects etched in black upon them can be readily altered. It is thus possible to change the objects visible in each panel. By rotating the hexagon on its base all six panels can be presented to the same observer. Each panel contains 16 objects for analysis, there are therefore 96 possible combinations. The middle apertures contain 3 letters each, set either normally or in an abnormal position. In the bottom aperture are two objects such as an aircraft, an arrow, or a cross. The top panel is only employed when consideration is being given to the examination of possible malingerers. Each section of the hexagon is lighted by a central single electric 12-volt lamp of 4 watts, surrounded by a blue filter, so as to reduce the red effect of the lamps. Each lamp illuminates the six sides of its own section, so each observer examined is subjected to the same brightness level. The observer sits one yard from his panel. The visual angle subtended by the letters and objects at this distance, when taken separately, is not sufficiently large to stimulate the rod area, but when seen in groups as designed, the angle subtended is one of 6°, therefore meeting all requirements.

The candidates are prepared by wearing dark goggles of equal transmission for half-an-hour before entering the test room, in this way the six examinees are in a comparable state of adaptation. They enter the room, from which all light can be completely excluded. Some points about the test are explained while the room is still illuminated. The light is then turned out, and the subjects, taking off the dark goggles, remain in complete darkness for a further 15 minutes. This total period of preparation, viz. 45 minutes, is considered fully sufficient for accurate comparison. Each subject is given a board on to which a Braille type card is clamped. A central metal strip, provided with buttons, which are easily differentiated in the dark, provides a means for localization and pencils are attached. What the examinees have to do is next

fully explained during the 15 minutes when they are in complete darkness. Scoring is done by giving a mark for each correct answer. The examinee writes on the left side of the Braille card the objects recognized; on the right side of the card he writes what he can make out of the letters.

It is of interest to note that "at the extreme end of the scale it has been found that approximately 3·5 per cent. of personnel record between 30 and 32 marks, while 2·5 per cent. score less than 2 marks. Between these come the main body of all subjects of the ages 18-30 years; the peak lying in the region of 20 marks."

The author ends this instructive paper by general considerations, such as the night sky, the influence of oxygen on night visual capacity and visual preparation for night flying. A short summary concludes the paper, together with a list of references. The paper is illustrated by a couple of graphs, a photo of the hexagon, the examinee and the controller, with an enlarged facsimile of the Braille recording card. There are also cards showing (*a*) the highest score possible 32/32; (*b*) a poor result, 2/32; (*c*) a score of 23/32 representing at ground level in the average group; and (*d*) a score showing the effect of oxygen want upon night vision in the same subject whose card was *c*, where the score was reduced from 23/32 to 6/32.

R. R. J.

BOOK NOTICES

Orbital Tumours: Results following the Transcranial Operative Attack. By WALTER E. DANDY, M.D. Pp. xvi—168, Illustrations, 100. London: H. K. Lewis & Co. Ltd. 1942. Price 25/-.

In his preface to this admirable monograph Alan Woods states that it is the custom in the Johns Hopkins Hospital for orbital tumours to be divided into two groups. The anterior ones, where there is no reason to suspect an intracranial extension, are removed by the conjunctival or upper orbital route, the others are referred to the neuro-surgeon who employs a transfrontal approach opening first the skull and then removing the roof of the orbit. By this means intracranial extensions can be more adequately dealt with and infection avoided. Although removal of the orbital roof might be expected to produce a pulsating exophthalmos, this did not occur.

The main part of the book consists of an account of 31 cases giving full details of signs, symptoms and operative procedures, with illustrations remarkable for their clearness. These cases are described in such a graphic manner, that they make fascinating reading, very different from the usual case records, and they certainly provide a strong argument for the transcranial approach to orbital tumours.

This monograph will be eagerly read both by ophthalmic and by cranial surgeons.

The Ophthalmic Formulary. By G. GRIFFIN LEWIS, M.D., F.A.C.S. Springfield, Illinois, U.S.A.: Charles C. Thomas. 1942. Price $3·50.

This little book is arranged in two parts: in the first diseases are printed in alphabetical order and under each heading various prescriptions that have been used, together with the name of the original prescriber. These prescriptions include some for general therapy as well as those for local application. The second part consists of an ophthalmic materia medica, a list of those drugs used in ophthalmology arranged alphabetically. There is also a full index. The book is exceedingly well got up, paper and printing are excellent, and blank leaves for notes occur at intervals throughout. The student should use this book as an adjunct to his text-book of diseases of the eye, for were he to rely solely on the first part of the formulary for the treatment of such a condition as ophthalmia neonatorum his results might not be very satisfactory. Two prescriptions are given under this heading, the first containing zinc sulphate, boric acid, adrenalin chloride and distilled water, the second, chlorazene (Abbott) 0·25—1%. We assume that the first of these is to be used in the convalescent stage of the disease, but it is a pity that the author did not stress the need for painting the lids with silver nitrate in the acute stage or even mention the recent sulphonamide therapy. We note that the word miotic is correctly spelt in the materia medica and regret to find it spelt "myotic" in Part I. A good selection of prescriptions is offered and the book will be found useful in practice while its size is such as to fit easily into one's pocket. The English agents for the American publisher are Messrs. Baillière, Tindall and Cox.

NOTES

Mobilization of State Forces for Prevention of Blindness

THE supplement to the *Sight-Saving Review* of March, 1942, bears this title. It can be obtained from the National Society for the Prevention of Blindness, Inc., 1790 Broadway, New York, and is published at 35 cents.

Robert T. Lansdale, Director, Institute of Welfare Research, Community Service Society, New York, introduced the symposium in a brief speech and called on Mr. John W. McConnell, Assistant Professor of Sociology, Department of Political Science and Sociology, New York University, to read his paper on "State Authorization for a Prevention of Blindness Programme." His conclusions are summarized as follows:

"First, adequate authorization for prevention of blindness work

may already exist in statutes or discretionary powers granted to administrators. It is necessary to keep the administrator informed of needs and the possibilities of his office, if the authorization is to have any value. Second, an inconceivable amount of prevention work is already being done by a score of government agencies, but these efforts lose much of their potential power by being poorly integrated. Third, positive governmental action of the future will require certain structural changes in government. This should not cause fear or insecurity since government service seems to be an expanding rather than a contracting field of action. Finally, the truly great need at the moment is for willingness on the part of government officials to see the problem of prevention of blindness as a comprehensive programme and not merely as a special phase of the work of some one governmental bureau or bureaus; as a programme in which all can co-operate, and not one in which personal or professional interest must be safeguarded."

Two important appendices are affixed to this paper:

A. Summary of state legislation related to Prevention of blindness and conservation of vision.

B. Provisions of legislation now in force concerning the prevention of blindness.

At an afternoon session "Patterns in Practice—A Panel Discussion" took place. Among those who contributed were Dr. C. E. Rice, Consultant on Blindness, Bureau of Public Assistance, Social Security Board, Washington; Dr. J. Y. Battenfield, who spoke on the trachoma control programme in Oklahoma; Mr. Hayes, Supervisor of the Services for the Blind in Kansas; Miss Sexton, of Concord; Mrs. Wanamaker, of Olympia, Washington; Miss McCoy and Mr. Philip Williams, of New York; Mr. Cameron, of Washington; Miss Carpenter, of Philadelphia; and Miss Hayden, of Chicago.

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Royal Society of Medicine

THE meetings of the Section of Ophthalmology during the session 1942-43 will be held as follows:—

Friday, October 9, at 5.0 p.m.
Friday, November 13, at 2.30 p.m.
Friday, March 12, at 2.30 p.m.
Friday, April 30, at 5.0 p.m.
Friday, June 11, at 5.0 p.m.

Cases and specimens will be shown half-an-hour before the advertised times of the meetings.

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Special Notice

WE are asked by the Ministry of Information to state that the fact that goods made of raw materials in short supply owing to war conditions are advertised in this journal should not be taken as an indication that they are necessarily available for export.